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PRESIDENT'S ADDRESS

CLARENCE GUNTER, M. D.
Globe, Arizona

(Address of the President before the Arizona State Medical Association, at its Forty-first Annual Meeting, held in Globe, Ariz., April 21-23, 1932)

A signal honor has been bestowed upon me by you, my fellow members of the Arizona State Medical Association, and I assure you it is an honor duly appreciated and higher than I ever had ambition to hope for. It is, indeed, an honor to have lived for thirty-one years in Arizona, to have been associated in that time with so many men of such high standing, to have made so many friends among you, and to have retained the friendship of so many of you, that you have presented me with your presidency for the coming year. At the end of my year of office as your president, it is my hope that I shall still maintain your friendship, and that you will feel that your trust in me has not been misplaced and that some benefit to the medical profession of Arizona will have accrued during that time.

As to the membership of the Arizona State Medical Association and its high standing, no words of praise are needed on my part. No profession demands so much of its members as the medical profession, and none other gives back so little in return. Except for that rare satisfaction which we all inherently have in doing a thing well and in knowing of the much good that we do, of which the world is ignorant, there is small remuneration. In these times of depression and positive distress and privation throughout the state and nation, there is no class of citizens who are more burdened than is the medical profession. And we of Arizona, in addition to the national depression, are more particularly distressed as the principal industry of our state is practically annihilated, the industry which has paid 40 per cent of the taxes of the state and upon which 50 per cent of the citizens of the state are more or less dependent.

But Arizona is set apart from all others by nature's especial favor, and, though we are suffering a depression, there is no withdrawal of nature's blessings, no disaster reducing or impairing our vast potential wealth. I refer to the wonderful climate, scenery, and health-giving sunshine which are ours. Arizona is the natural playground of the Southwest, and a year-round resort for pleasure and health. To take advantage of these wonderful resources for the good of our state becomes a part of the duty of the Arizona State Medical Association. An aroused citizenship should frankly challenge the idea that Arizona will be bankrupt following the loss of our copper industry, and that our present suffering is necessary and inevitable, and will be continuous with that of the nation.

It, therefore, behooves us to bring Arizona's attractive resources to the attention of a vast number of people in the United States who are seeking a place to enjoy the latter years of their life in tranquility, with a comfortable sense of security. There are thousands of people in the North, Middle West and in the cold Eastern states who have a competence and are seeking such a place to spend their declining years. Such

people are being advised to go to Florida, Georgia, South Carolina, North Carolina, California, and even New Mexico, by many family physicians. They know nothing of the beauties of Arizona, only that Arizona is very lax in regard to the practice therein of various cults and faddists. As a matter of fact, no state can boast of such a high standing medical profession as we have, but we are tarred with the brush of the cults.

Another problem which faces the profession is the effort being made by certain insurance companies to lower the standard of the present fee schedule of the Arizona Industrial Commission. While this does not affect certain classes of the medical profession, it does affect the largest proportion of them. This fee schedule was drawn up by a committee of yours at the time of the inauguration of the compensation law in Arizona; it represents the composite opinion of the committee, and was approved and put into effect by the first Industrial Commission and has been continued practically without change since its adoption. This schedule will not be changed by the Industrial Commission if we of the Arizona medical profession, each and every one of us, make every effort at all times to be eminently fair and just in our various dealings with the insurance companies, the Industrial Commission, and the injured patients, and if we condemn without recourse any member of our profession who stoops to make a dishonest charge, and, when such a dishonest transaction is exposed, we stand behind the Industrial Commission and thereby maintain the honesty and integrity of our profession.

While on the subject of the Industrial Commission, I call to your attention the agitation for the extension of industrial compensation into the field of occupational disease. I quote from a recent report of the Industrial Commission of South Dakota: "The original idea of the workmen's compensation law was that of helping the injured worker to bridge over his troubles until he was again able to resume his ordinary labor, but by actions of legislators, courts and commissions, it is beginning to approach that of a general plan of health and accident insurance." I think this matter should be discussed and a stand taken in accordance with the opinion of the Arizona medical profession. It is, no doubt, an entering wedge in the formation of future, and vastly more extensive, systems of insurance, comparable to the European systems, to which physicians and dentists most strenuously object. In these systems there is no choice of physicians, professional confidence is not respected, there is a mass of lay interference, the tendency to reduce fees to a minimum is already apparent; and charges of undue influence on professional testimony, by employers and insurance companies on one side and by malingering employees on the other, are already common.

CONTRACT PRACTICE

The Judicial Council of the American Medical Association has defined contract practice as follows: "By the term Contract Practice as applied to medicine is meant the carrying out of an agreement between a physician or group of physicians, principal or agents, and a corporation, organization, or individual, to furnish partial or full medical service to a group or class of individuals for a definite sum or for a fixed rate per capita." This subject is so large and has so many ramifications that it cannot be gone into fully at this time. However, it is a subject of great potential interest to the members of the Arizona Medical Association.

There are a great many conditions in Arizona under which contract practice is not only legitimate and ethical but, in fact, the only way in which competent medical service can be provided. However, there is a form of contract practice which has not, as yet, made its appearance in Arizona, but with which we may have to contend sooner or later. I refer to the so-called mutual hospital and health associations that have sprung up in certain states of the Middle West and in California. These associations are controlled by groups of laymen or by individuals offering medical and hospital service to anyone who will buy a member-

ship and pay a nominal sum each month. The Judicial Council of the American Medical Association states, "Such schemes have been put into operation in various places and have failed within a few weeks or months because of inadequate income or because of the failure to render good service. The Judicial Council has regarded these schemes as being economically unsound, unethical, and inimical to the public interest."

I think this matter should be brought to the consideration of the Council of the Arizona Medical Association and thoroughly discussed and a proper stand should be taken thereon.

CULTS AND PRACTITIONERS

On account of the lax laws and inefficient enforcement of the Medical Practice Act, Arizona has become the Mecca and the dumping ground of a large number of irresponsible and pernicious practitioners. It is the presence of these in Arizona which has brought such disrepute to our standing in other states. To remedy this evil, there was an effort made in the last two legislatures to pass a Basic Science Act, copied after the acts in several other states, where it has proved so efficient as to clear these states of quackery. I recommend that such an act be again presented to the next legislature of Arizona and that the entire medical profession get behind the Public Welfare Committee of the Association so that this legislation can be brought to a successful termination.

STATE MEDICINE

The forces of progress are inexorable in their control of man and his fate. One of the greatest questions before the profession today is whether the physician is his own master or a servant of his patients, of the public, and of the state. There is a measure of public service in nearly every act of the physician. According to the wisdom of his acts, he can save the public and state or saddle them with the support of many weaklings and cripples.

His relation to the economies of modern life is changing daily with the progress of the times, but we must keep in mind that it is a serious matter to overthrow the traditions of the profession and to institute new and unproved methods in the practice of medicine, or to attempt to establish a new basis of public and professional relations. We must so hew to the line that no new conception of a medical practice can arise that will start that great bugaboo called "state medicine." If we so do, this new conception will not arise soon enough to affect our generation.

MEDICAL ETHICS

The reputation of the medical profession in its standing, to a large extent, is dependent upon the moral code which guides our actions. In these times, too little respect is given to general ethics, and to no group or profession are sound ethics more important than they are to medical men. They must be the controlling influence of our lives.

There are many practices among unethical men, which are abhorrent to any man of honor. I refer to unnecessary operations performed, such operations os are done through ignorance, dishonesty, or bad judgment.

The three essential requirements of medical men are honesty, good judgment, and scientific training. The most essential of these is honesty. These requirements should be recognized by both the profession and the public. I have the greatest confidence in the integrity of our profession and that the vast majority of the members of the Arizona Medical Association live up to the highest ethics of the profession.

Arizona is essentially a state of very small communities, and the best evidence of the high standing of the medical profession is shown in the esteem in which members are held in their communities. There is no place where one is submitted to a more merciless scrutiny than in the small town, nor is one likely to be judged more justly and given higher praise than in these small communities. The medical man is looked to for counsel, advice, and aid in all sorts of crises and conditions. There is no one who has more influence than he in his community. Of course, he is not loved by everybody, but he has the respect of everybody and the real affection of a great many, and herein lies

the panacea of most of the problems of the medical profession in Arizona.

Every doctor should take an active part in the politics of his community and the state. Each individual running for a public office, especially in the legislative and the executive departments of the government, should be closely scrutinized and his position ascertained on all vital questions which are of interest to the medical profession and the public welfare of the state. I do not recommend that the doctor become a professional politician, but I do want him to exercise some choice in the selection of the representatives in the state legislature, so that we shall not again run up against a brick wall in our attempts to better conditions for the general welfare of Arizona. Advice on all questions affecting health and its associated conditions should be sought from the medical profession and such laws should originate with the profession. Instead, many of the legislators have looked with suspicion upon every attempt to better medical conditions, and, as a result, there has been failure. We are to blame in not seeing more intelligent men selected to represent us.

I recommend to you to so change our By-Laws, that the Council of the Arizona Medical Association shall meet in conjunction with the Committee of Public Welfare and the other officers of the Medical Association, at stated intervals, at least four times a year, to take up and discuss the problems of the Association, with full authority to act in matters for the best interests of the medical profession and the public.

I again thank you, gentlemen, for the high honor which you have given me, and I assure you that I shall do everything within my power to merit this trust.

THE COUNTRY DOCTOR OF THE FUTURE

F. D. VICKERS, M. D.
Deming, N. M.

(Address of the President before the New Mexico Medical Society, at its Semi-Centennial Session, Santa Fe, N. M., May 19-21, 1932.)

We, as doctors of medicine, have inherited from the ages a professionalism that leaves us amiss as business men. We are imbued with the idea of curing disease and, when we have become expert in the cure, we find we must deny ourselves the profit of our skill by preventing that which we would cure.

Our medical forbears have guaranteed to future generations, without money and without price, a knowledge, a foundation, a professional manner in the prevention and cure of disease. Now we come to times when we wonder if our professionalism, so founded, can survive.

We have discarded the habiliments which marked the doctor of other times. We hobnob with the business man; we serve on his boards; belong to his clubs; play his games and, along with him, subscribe to charities, although we give free care to large numbers of people which society has not as yet found any business method of guaranteeing medical care when they are, for any cause, impoverished. The average business man's hope and dominant ideal, in our democratic age, is to improve his own condition by making, buying, and selling, for profit. The medical man's ideal is to lessen disease, and no one would knowingly employ a physician who would not prevent, if possible, that which he is prepared to treat.

In spite of great endowments, the money required for education and equipment of medical men is a never-increasing amount. The medical man of today should have a business right to expect money so invested to pay dividends—and dividends nowadays are not generally reckoned by the number of microbes hunted down.

A muddy crossroad is hardly the place for a bank or an up-to-date doctor. The place to practice medicine is, naturally, where the people are or can congregate. We live in a great new country settled by peoples who came to our shores with land hunger and our land has been settled up—even our Rocky Mountain region is fenced. Still we have in the United States a population of only forty to the square mile, while England has seven hundred and one, and Belgium six hundred and five.

We have in the United States 152,000

rural one-room schools, with more than three million pupils that as yet have not come under the consolidated school system. Many of these country people are necessarily more or less isolated. They need protection against contagious and nutritional diseases, such as smallpox, diphtheria, scarlet fever, typhoid fever, malaria, hookworm, pellagra, and rickets. They need early diagnosis in tuberculosis, syphilis, cancer, and other chronic diseases. These people have lost the crossroad doctor. He has died or moved away to the city to become a specialist, and there is no prospect of his place being filled by the oncoming medicos. In one generation, fifty per cent of the doctors have become specialists, and now fifty per cent of the medical students display a missionary spirit by selecting a specialty before they graduate. There being no special requirements for the specialist, we may possibly have, in time, too many who specialize. Specialism has come to stay, and the advance to be made in medicine in the future will not be made by the country doctor like Jenner and Koch. It seems more likely the future discoveries will come from much co-operation in large centers, by the correlation of work of many well-trained men. The general practitioner is the man to carry this knowledge we have gained to the people, and he also will give advice on many mean and unscientific troubles.

While we may hope for the time to come when impoverished peoples shall be guaranteed the necessities of life, including medical and hospital care, by some form of taxation or insurance, or by right of inheritance, there can never come a time when we can be expected to be well paid in money for all honest advice, and get patents on our microbe discoveries.

Twenty-seven million people are on farms and lend a stability to our government not generally recognized in our factory age. To-day the great mass of French peasants hold the national fortune. Eighty per cent of heads of families own land. The great proportion of savings is in their hands.

If the profits of our economic system, born of our industrial revolution, dry up, the waves that have gone from the country to the city may form a back-wash and carry the people back to the farms, and, while they may not sing as they work or make a festival of planting and of harvest time, they may at least earn their bread and have hope in the stability of our land. They will be spared the hardships of their ancestors who, on foot and in wagons, wrested the country from the wilderness and Indians, with high hope and determination to win or die.

Should some great catastrophe wipe out all of our great cities, the country would build new ones; should the country be destroyed, leaving the cities, they would be doomed. Our great industrial age has coaxed too many to the cities. The United States is an agricultural country. The farming industry is basic to our national prosperity to a greater extent than in many other countries. These scattered peoples of ours are entitled to the benefits of our scientific knowledge and are bound to have it by some method, sooner or later. Scientific knowledge is not discovered for the benefit of the city people alone.

By taxes, the city people who cannot pay have free hospital care, and sometimes politics lend this care to many who could pay. We should be able to help mold public opinion which would promote and foster some plan by which a small tax, with, possibly, a community budget and other help, would guarantee small community centers for these outlying districts which have no medical care. With our modern transportation and good roads, this would be both logical and practical. This center should be in close communication with larger centers.

A health officer—not necessarily full-time, a general practitioner, a health nurse, a few beds, and x-ray, with the aid of the state laboratories, could offer to these people diagnosis, prevention, and treatment, of disease. The infant mortality rate in New Mexico is frightfully high, due to poverty, neglect, and ignorance. Of these dying infants, one-third are never seen by a doctor. These medical centers would guarantee much to the poor and neglected, and help educate the ignorant.

In this scientific age, the general practitioner is especially blessed by the fact that the discovery of a specific for a disease has always simplified the treatment of that disease, and the treatment and prevention can be carried out by him.

A very small percentage of these isolated people need the services of a specialist, and this percentage should be guided to the specialist by the general practitioner.

We tax to support our schools, and a further tax to guarantee the health of school children and the community would not be burdensome. We are now paying this further tax in penalties. Science helps to determine democratic development. These people should not be denied what science has for the prevention and care of disease, and medical men should back some system to take the place of the good old country doctor who used to go to the people. In the future, the people will have to go to the doctor.

IMMUNIZATION AGAINST DIPHTHERIA
(Toxoid Compared With Toxin-Antitoxin Mixtures)

MENNO S. GAEDE, A.B., M.D.
Jerome, Arizona

(Read before the Forty-First Annual Meeting of the Arizona State Medical Association, held at Globe, Ariz., April 21-23, 1932.)

In 1897 Ehrlich[1], in his exhaustive and thorough research, studied the reaction between toxin and antitoxin. He was the first to use the word "toxoid." In his extensive investigation into toxin and antitoxin, he noted that the toxin would deteriorate with time; that is, a toxin bouillon which was found soon after preparation to contain, say, 100 units toxin in a certain given quantity, would, after four or five months, be found to contain but 50 toxin units in the same gross quantity. It had lost, therefore, one-half of its toxic power. In spite of this loss, however, Ehrlich found that such bouillon had retained its full original power of neutralizing antitoxin. Such an altered toxin Ehrlich called toxoid.

Von Behring[2] in 1913 was the first to employ toxin-antitoxin as an immunizing injection in man. He used the undiluted toxin broth with its toxin nearly neutralized. In America, the pioneer work in diphtheria immunization was done by Park and his collaborators. They were the first to realize that, by using the Schick test to determine the susceptibility of children and a retest to note the change in the reaction, they could closely study the immunizing effects of the toxin-antitoxin injections in the human beings.

Toxin-antitoxin, as defined by Park[3], is toxin plus antitoxin, enough to not quite neutralize the toxin and yet greatly reduce the toxicity. It is essential that this preparation be very carefully prepared and standardized by testing its toxicity and potency on guinea pigs. The first preparations of toxin-antitoxin used were the 3L plus doses, but it was soon discovered that this amount of toxin caused considerable reaction locally, and so Park[4] and Schroder diluted the toxin before adding the antitoxin and found that 0.1L plus dose was just as efficient in producing immunity as the more concentrated mixtures; however, smaller amounts than the 0.1L plus dose were less immunizing. These writers state that the most important point is that toxin-antitoxin, to have the maximum effect, has to have such toxicity that a human dose kills a 250-gram guinea pig in about four weeks. With decreasing toxicity, the immunizing effect is gradually diminished. This new preparation gave much less local reaction, since the reaction was due not so much to the specific toxin as to other substances, especially the dissolved bacillus substance. The 0.1L plus toxin-antitoxin, even under the best conditions, will become less toxic with age, except when frozen, but even then it is never dangerous to human life. Toxin-antitoxin deteriorates with age, and this is a distinct drawback because, when the commercial preparation suffers thus through transportation and storage, it loses some of its immunizing properties and, hence, becomes less effective, which may be the explanation of why some writers report from 50 to 70 per cent negative Schick tests, and others get

as high as 85 per cent after three injections of toxin-antitoxin.

In America, until recently, toxin-antitoxin has been used almost exclusively in the immunization against diphtheria. The lack of any extensive trial of toxoid in this country is largely due to the impetus given to toxin-antitoxin prophylaxis in diphtheria by Park and his associates. Through their laudable efforts, a marked reduction in the incidence of diphtheria has been effected in America. But even in spite of mass immunization against diphtheria, there still occur annually thousands of deaths due to this disease. In Ontario[4] in the five-year period from 1921 to 1925, one out of every six deaths among children in the age group of 2 to 14 years, was due to diphtheria. In New York City in the year 1920, diphtheria was the cause of 800 deaths, while in 1929, 416 deaths occurred, and in 1930, this had dwindled down to 198 deaths. In New York City in the past fifteen years, over 500,000 school children have been immunized against diphtheria and, during the last two and one-half years, due to an extensive drive to stamp out this disease, over 250,000 infants and pre-school children have received it. All this immunization work was performed without any accident. In Yonkers[5], New York, in 1927, were 438 cases of diphtheria, with 23 deaths; in 1928, 152 cases with 11 deaths; in 1929, 66 cases with four deaths; and in 1930, 22 cases and one death. In the town of Jerome, Arizona, where we have about 1200 school children registered and many children of pre-school age among the closely housed Mexican people, there has not been one case of diphtheria reported in the last fifteen months. In the last two years, approximately 85 to 90 per cent of all school children and many pre-school children have received either toxin-antitoxin or toxoid injections. This last fall all school children twelve and younger, regardless of any previous toxin-antitoxin, were Schick tested, and all the positive reactors were given two one-cubic-centimeter injections of toxoid.

This study comprises data on 719 cases, the large majority of which are children of school age. The material used for immunization was purchased through the Arizona Public Health department and was a product of a well-known manufacturer of biological products. All material used was well within the limits of the expiration date printed on the containers. In this group, all children except the pre-school group were given the preliminary Schick test to determine their susceptibility to diphtheria. Those showing a questionable test were regarded as positive. There were 103 children, ranging in age from 1 to 15 years, who had received three one-cubic-centimeter injections of toxin-antitoxin at weekly intervals. They were retested with the Schick test from four to six months after the last injection of toxin-antitoxin and 68 per cent gave a negative reaction, leaving 32 per cent still susceptible to diphtheria. No control Schick test was done and the reading was done on the third and fifth days.

Two one-cubic-centimeter injections of toxoid were given to 616 children. The interval between the two injections varied from three to four weeks. Of this group there were 112 pre-school children who had not received a preliminary Schick test. Forty per cent of this group were children under 2 years of age, none being younger than 10 months. There were no reactions of note in any of these children, either after the first or second toxoid injection. The immunity response of this group was very disappointing. No control Schick was done. Eighty-six, or 76 per cent of the 112 children, were Schick negative and 26, or 25 per cent, remained susceptible. In attempting to explain the poor result obtained in this group, it was thought possible, because the majority of the children were Mexicans, whose parents talk and understand English poorly, if at all, and who frequently appear with a different name, that there were children with a positive reaction who had never received any immunizing injections, and thus the percentage of negative reactions would be lower. The original number given the first toxoid, in the pre-chool children, was 225, and the final Schick test was done on

145 cases, of which 112 appeared for the reading of the Schick test. In one Mexican family, with four pre-school children, three reacted strongly positive and only one was negative. Could it be possible that, in some children, due to familial characteristics, it is difficult to produce an immunity response?

In school children between the ages of 5 and 7, there were 185 cases: of these, 160, or 85.2 per cent, responded negatively to the Schick test, 10 to 12 weeks after the final dose of toxoid. No control Schick was done. In this group, the reaction to the toxoid injections was moderate to slight in approximately 6 per cent of the cases. Eleven children of the 185 were marked absent on the teacher's record book the first or second day after the toxoid injection; this, however, cannot be interpreted as meaning that all the absences were because of the toxoid injection.

The largest group of children tested consisted of 319 cases and were children of 8 years and older, the greatest proportion being children 8 to 12 years of age. This group also included four adults (teachers). Except in the four adults, no diluted toxoid tests for testing the sensitivity of the individual to this preparation were made. Of the 319 individuals, 292, or 91.3 per cent, gave a negative Schick test, 8 to 12 weeks after the final toxoid injection. As in the previous group, no control Schick was performed. Reactions were more severe and frequent in this group. Two Mexican female children, ages 11 and 12 years, had marked local and severe systemic reactions. Locally, there was swelling of the entire upper arm with redness and great tenderness. The general symptoms were headache, malaise, anorexia, vomiting, sore throat, and elevation of temperature up to 100 to 101 degrees F. All these symptoms subsided in 48 hours. The reactions occurred with less severity after the second injection. Of the total, 10 to 12 per cent showed moderate reactions, and 12 to 15 per cent, a slight reaction. Twenty-seven children missed school on the first or second day following an injection of toxoid. Forty-two of the 319 individuals had a course of immunizing injections of toxin-antitoxin prior to the injections of toxoid. All these 42 children were Schick negative after the second toxoid dose.

The preference that toxoid or antitoxin of Ramon has received in France and Canada in the last few years, is due to certain important advantages that have been observed in the use of this preparation. In 1928, Ramon and Helie[6] brought before the American medical profession the reasons for the advantages of toxoid. Toxoid, as defined by these authors is a potent diphtheria toxin treated with formaldehyde and prolonged heat. This produces complete detoxification of the material, which is tested as to its potency and non-toxic properties by injections into guinea pigs. Five cubic centimeters of the detoxified substance, injected into a 300-gram guinea pig, must not create any toxic symptoms in the pig. A standard toxoid contains 8 to 10 anatoxin or antigenic units per cubic centimeter. This is determined by the flocculence test which consists of the reaction in vitro, between the specific toxin and antitoxin. Toxoid must be innocuous, stable in its anti-genic power, heat resistant up to 65 to 70 degrees centigrade, and have high immunizing properties.

Toxoid contains no serum and, consequently, there is no danger of creating sensitization of the patient to later injection to horse serum. However, toxoid does contain from 30 to 50 times as much protein (from the broth and the organism) as is present in toxin-antitoxin. Due to the fact that, in adults and many older children, sensitization to the Klebs Loeffler bacillus has developed, it is thought that this is the reason for their reaction to the toxoid and the pseudo-reaction of the Schick test.

Long before Ramon demonstrated the clinical efficacy of toxoid, Glenny and Hopkins[5] used toxoid in the immunization of horses for the production of antitoxin (1904). These investigators, by the use of a concentrated form of toxoid, were able to detect antitoxin in the blood of a normal rabbit 9 days after the injection of the tox-

oid, and also showed that a guinea pig became Schick negative 11 days after an injection of the concentrated toxoid.

Using a highly concentrated and purified toxoid, Claus Jensen[9] was able by a single injection to confer on man a marked immunity to diphtheria. In a small series of children from 3 to 8 years old, he was able to establish immunity, as tested by the Schick test, in 88 per cent of the children. He used aluminum hydrate for concentrating the toxoid and injected material that contained 150 antigenic units per cubic centimeter. The injections were made in the subscapular space and caused no more reactions locally, or generally, than did the same number of cases given a standard dose. Jensen noted that, by using the concentrated toxoid, the immunity was established very rapidly, nearly 70 per cent being Schick negative after 15 days. Because of this rapid immunity established by the use of the concentrated toxoid, he warmly recommends its use in epidemics.

The review of the medical literature will soon convince us that the use of toxoid in diphtheria prophylaxis in the last few years has become very popular. This popularity is chiefly due to the large percentage of immune cases obtained by the injections of only two doses of the material. Ramon and Helie[8] report that, in France, in 1927, the number of vaccinations was 50,000; in 1928, it had reached 300,000; and in the first six months of 1929, it was 500,000. Ramon uses three injections of toxoid. The first injection consists of one-half cubic centimeter. The third injection, of one cubic centimeter, is given 15 days after the second. By using this method, Ramon and Helie state that from 95 to 100 per cent of Schick positive reactors would become Schick negative from two to three months after the last injection of the toxoid. Lesne[11], in over 1000 children, obtained a negative Schick response in over 90 per cent of the children by the use of two injections of the toxoid. Loiseau, et al[12], by using three injections, obtained 99.4 per cent immunity in 161 children. Dick and Dick[13], in a comparative study of toxin-antitoxin and toxoid, on adults, report that, with five injections of toxin-antitoxin at weekly intervals, 82 per cent showed a negative Schick test, while 94 per cent immunity, two months after the last of three injections of toxoid, was obtained. These writers very highly recommend the use of toxoid in the immunization against diphtheria. Lai[14], in 105 Chinese students, was able to secure only 65.8 per cent negative Schick test three months after the last injection of toxin-antitoxin, while he got 91.5 per cent negative Schick tests following three doses of toxoid. This writer, however, remarks that the reactions following the toxoid injections were much more severe than those resulting from toxin-antitoxin. Weinfelt and Cooperstock[15], on a series of 104 well-controlled adult cases, by giving two injections of toxoid, obtained 92 per cent Schick negative reactions. They found that 25 per cent were reactors to the intradermal diluted toxoid tests and that 7.3 per cent had a general and local reaction following the injection of toxoid. These authors maintain that, "while in a general way it was found that local reactions to toxoid are much less frequent as compared with those of toxin-antitoxin, general reactions to toxoid were observed with greater frequency. Reactions to toxoid in young children are rare. Study on the nature of these reactions to toxoid tend to indicate that allergy plays an important role in their manifestation. Particularly striking was the high incidence of reactions to toxoid in persons presenting both a history of allergy and a pseudo-reaction to the Schick test".

In a series of 117 infants of 2 years and under, 60 per cent being 8 months old and under, Greengard[16] obtained a negative Schick reaction in 98 per cent. He gave two one-cubic-centimeter injections of toxoid; in 81 cases, with one week interval between the injections, and, in the remainder of the children, with three-weeks interval. He did not observe any difference in the immunity response in the two groups. Many of his cases reacted negatively to the Schick test two weeks after the last injection of toxoid.

Working with adults, Kracke and Allen[17],

on a small series of controlled cases, found that toxoid (two injections) produced immunity in 88 per cent, while three injections of toxin-antitoxin produced only 56 per cent negative Schick reactions. The use of toxoid was characterized by the frequency of severe reactions, while toxin-antitoxin was responsible for only a few reactions of less severity. These investigators conclude that such results only serve to emphasize the importance of immunizing children before the age of six years.

In a comparative study of toxin-anti- of 0.1L plus dose of toxin-antitoxin, he pro- 355 children immunized with three injections of OIL plus dose of toxin-antitoxin, he procured 64 per cent negative Schick tests, and in 475 children receiving two doses of one-cubic centimeter of toxoid, with an interval of one month, he obtained a negative Schick reaction in 95 per cent.

It is evident from the results here reported, and those reported by many others, that diphtheria toxoid, as it is to-day available, is a superior immunizing agent compared with toxin-antitoxin.

Whether one uses toxin-antitoxin or toxoid in the immunization against diphtheria, there are certain fundamental facts one connot overlook in carrying out a successful program for diphtheria immunization. It is necessary that the product used as the immunizion agent is of the required potency, and that a Schick test be done on all cases immunized. Roads", of the Cook County Hospital, investigating commercial preparations of toxin-antitoxin, found that there was a very great variation in the potency of the commercial preparations on the market, and even considerable difference among the lots made by the same manufacturer. He found that of 64 nurses who had, within the last two years and prior to three months, had three injections of toxin-antitoxin, 67.2 per cent reacted positive to a Schick test. Of this group of nurses, 10 developed diphtheria, showing a high percentage of diphtheria in supposedly immune individuals. Roads concludes that, "to obtain good results, the potency of commercial preparations employed must be carefully controlled and, from results here reported, the necessity for Schick retests three months after the last dose of toxin-antitoxin and more immunizing doses when they are indicated, is evident."

Nothing has done so much harm to interfere with the campaign against diphtheria as the occurrence of diphtheria in supposedly immune subjects; this could be largely prevented by the proper use of the Schick test on all cases immunized. That certain errors can occur in the application and interpretation of the Schick test, is not deniable; however, when one is careful to use freshly prepared material, well within the limits of the expiration date, and uses good care in the injection, the percentage of error should not be great. A control Schick is very desirable, especially in adults and older children, in order to recognize the pseudo-reactors, because in these reactors very often the toxoid will also produce a rather marked reaction. According to Cooperstock" and Weinfeld, the importance of performing a control test lies primarily in the detection of pseudo-reactions to the Schick test, which seems to bear some definite relation to the diphtheria bacillus or a sensitization to a protein in the material. Park' estimates that positive reactions to cotnrol tests occur in about 5 per cent of the cases. Schwartz and Janney' emphasize the necessity of a Schick test thus: "Where the individual child is considered, none should nor can be pronounced immune to diphtheria, unless, several months after receiving the diphtheria prophylaxis, a negative Schick test is obtained." Gardham" becomes very emphatic and states that "It is absolutely essential that a Schick test be done 3 to 6 months after a course of toxin-antitoxin, to determine if susceptibility still exists." It is not so essential that a Schick test be done prior to the immunization, especially in pre-school children.

Park' recommends the use of the test in all older children and adults and brings out the fact that, in rural communities, 45 per cent of the adults are not susceptible, while in the cities from 70 to 85 per cent will give a negative Schick test. He points out two

factors that should be taken into consideration in deciding whether or not to give a Schick test prior to immunization: (a) age group, and (b) density of the population in the community.

It is generally known that infants and young children are very susceptible to diphtheria. Infants after the sixth month lose their inherited immunity. Many infants born in rural communities are susceptible very soon after birth. Babies within a few days of birth are found not to give a very good response to diphtheria immunization[1], but at 3 months or after, babies are suitable for immunization so far as their immunity response is concerned. It is the general consensus of opinion of many writers that children under 6 years of age seldom have any reaction as a result of toxoid injections. Schwartz[1] claims that, the younger the child, the less likely does a reaction seem to occur and that, once immunity is acquired, a child usually remains immune.

The single outstanding factor preventing the complete eradication of diphtheria deaths is the problem of immunizing the pre-school child. This is a problem almost entirely out of reach of the public health officer, and, therefore, becomes the duty of the private physician. Due to the high percentage of susceptibility in this age group, it at once becomes apparent that these children must be reached by our program of immunization against diphtheria before the mortality of this disease will be much further reduced. F. M. Meader [11] maintains that "the records of the last three years in Detroit show that, as far as prevention of deaths is concerned, the immunizing of one child 6 to 12 months old will accomplish as much as immunizing forty-nine children 14 years old." The ideal age group of children to protect with toxin-antitoxin or toxoid is from 6 to 18 months. Nearly every writer on the subject of diphtheria is from 6 to 18 months. Nearly every writer on the subject of diphtheria immunization emphasizes the necessity of giving toxoid or toxin-antitoxin to infants and pre-school children. Kinnaman[12], in a review of diphtheria in Kansas, concludes that "to be successful in the eradication of diphtheria, the pre-school group must be immunized. Babies should be immunized when they reach the age of six months." Fitzgerald [13] stresses the importance of immunizing children 6 years old and younger, because of the high incidence of diphtheria in this age group, and the less reactions resulting from the immunizing injections. Bloomberg and Fleming[14] suggest that, in children under six years, practically no reactions occur following toxoid injections. Fuersterman[15], in his conclusions, remarks, "Complete eradication, the object of diphtheria prevention, depends entirely upon the immunization of the pre-school child, who can be reached by none other than the private physician." This opinion is held by Schwartz[16], Park, Ramon, and others.

SUMMARY

1. Results with toxoid, in the active immunization against diphtheria, are recorded and compared with toxin-antitoxin. In 103 Schick-positive children, three injections, at weekly intervals, of commercial toxin-antitoxin, produced 68 per cent negative Schick reactions, 3 to 6 months after the final injection. In 504 Schick-positive individuals, two injections of toxoid, at three to four weeks' interval, gave a negative Schick test two to three months after the last injection in 86.2 and 93.1 per cent of the cases.

2. In 112 pre-school children, two injections of toxoid produced a negative Schick test in only 76 per cent. The reason for such a low immunity response in this group is not definitely accounted for.

3. The advantages of toxoid over toxin-antitoxin in the prophylaxis of diphtheria, are threefold: (a) The larger percentage of negative Schick tests obtained after the injections of the material, with a greater rapidity of establishing this immunity. (b) The avoidance of possible serum sensitization in the subject immunized. (c) The greater stability of the preparation and its absolute innocuousness.

4. The disadvantage of toxoid, compared with toxin-antitoxin, lies chiefly in the ques-

tionably more frequent occurrences of local and general reactions resulting from the injections. This, however, can be obviated by excluding those individuals who show a strong pseudo-reaction to the Schick test and those who are positive to the intradermal injection of the diluted toxoid.

5. The routine employment of the Schick test two or three months after the completion of the immunization, is regarded as essential.

6. Any program of diphtheria prevention must include and especially emphasize the necessity of immunizing the pre-school child.

CONCLUSION

The use of toxoid as an immunizing agent in diphtheria prophylaxis is highly recommendable, and, in children, is to be preferred to toxin-antitoxin.

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DISCUSSION

DR. C. V. BARLEY (Tucson): I should like to commend Dr. Gaede on the relatively large series of cases upon which this report is based, and on the careful manner in which he has proceeded in securing his results. There is always something to be learned from the re-evaluation of a procedure which has become standard, in that we are apt to develop too confident an attitude of security. We find from this report that. under carefully controlled conditions and usnig products meeting recognized biological standards. it is possible to obtain a higher percentage of positive Schick reactors after the customary time interval has elapsed, than is reported in most series. This was found true in the use of both toxin-antitoxin and toxoid, although the results conform to the majority of previous observations in that a higher percentage of immunities was obtained within a shorter time with toxoid. It seems unlikely that the omission of the control test was a factor here, as the false positive reaction has usually faded by the third day. and in almost all cases by the fifth.

At any rate, such surveys as this have helped us in forming our judgment about the method of choice. We can certainly say today that diphtheria toxoid holds that place in diphtheria immunization, where one year ago it might have been said with less certainty, and two years ago would have aroused violent discussion for lack of evidence. As the doctor states. the most important advantages of toxoid immunization over other methods are (1) its freedom from animal serum, (2) the more rapid production of immunity in a higher percentage of cases. and, of less importance, (3) the lesser tendency towards disagreeable reactions in smaller children. Dr. Parks of the New York City Health Department, who has had probably as extensive and as practical experience with this problem as anyone, says that there is no case on record of a fatal reaction to the small amount of horse serum contained in toxin-antitoxin, or of a case in which sensitization to such a degree had occurred from its use. Nevertheless, there have been some fairly severe ractions in the extremely allergic type of individual, so there is a valid argument for the use of a preperation like toxoid, which contains no serum. We are, apparently, recognizing more cases of allergy of all types than ever before. But we do not know yet just what influence the wider use of horse serum may be having upon the subsequent development of chronic allergic conditions such as asthma and hay-fever. Until we know more, its use should be tempered by thoughtful judgment.

In my own practice, I have been using toxoid almost exclusively during the past year and a half, with the exception of older children who have reacted positively to the diluted toxoid intracutaneously. The number of cases is yet too small to form the basis of a statistical report, but about 10 per cent showed a positive Schick test at the end of three months and were given an additional injection of toxoid. There have been no systemic reactions noted in children under 5 years of age, and very few local reactions of a mild nature.

Dr. Gaede raises the question of the possible influence of familial characteristics upon the immunity response. It has been found that there are a few children who seem to be unable to respond to the stimulus and manufacture antitoxin. Thiele (Archiv. fur Kinderheilkunde, Sept. 1931) reported 31 pairs of siblings in whom 27 pairs reacted similarly to the Schick test. Hirschfeld, at Warsaw, has worked out in a fairly comprehensive study, the relationship between the positive Schick test in the parents and in the offspring. He finds that, where both parents were Schick positive, all the children were apt to react positively also. Where both parents were negative, two-thirds of the offspring were negative and one-third positive. Where on parent was positive and the other negative, the children were 56 per cent positive. These findings would tend to indicate a familial factor in the presence or absence of natural immunity to diphtheria, and might be considered evidence in favor of a familial type of response to an immunizing agent. It also raises the question of whether or not, in some children, due to racial characteristics. it might be difficult to produce an immunity response. Dr. Gaede's cases were mostly Mexicans, where previous reports have been based, in most instances. on other nationalities or a mixture.

During the past year there has been an increasing interest shown in this country in the percutaneous method of immunization. using Lowenstein's ointment. developed in Europe. It is an ointment containing not only toxoid but an unfiltered full culture of dead diphtheria bacilli, supposed to produce an antibacillary action essential to absolute immunity. The advantages claimed for it are: (1) as effective as other methods (which is yet to be proved); (2) avoids introduction of foreign protein directly into the lymphatics; (3) no free toxin liberated in the system; (4) no constitutional reactions. Reports concerning it are still contradictory, some men, like Arthur Abt of Chicago, claiming as high a percentage of immunes as from any other method, and others finding a definitely lower percentage of successful immunization, with a tendency for the Schick test to become positive again after a year or less has elapsed. The technic employed is to rub into the skin a roughly measured amount of the ointment, using the chest, abdomen, or inside of the arms, as sites of election, and the surface is not to be washed for 24 hours. One might also mention the observation of Schick and Topper of New York that tonsillectomy tends to convert a positive Schick into a negative one.

I think such a survey as this emphasizes the importance of doing follow-up Schick tests on all cases. following immunization, and not sitting back with the assurance that nine out of ten of our patients are getting a satisfactory immunity response. The few cases which thus show persistently positive Schicks can then be given subsequent injections, and special attention may be paid to any throat condition which may supervene.

INDUSTRIAL SURGERY AND THE INDUSTRIAL COMMISSION

BURT H. CLINGAN
Phoenix, Arizona

(Read before the Forty-first Annual Meeting of the Arizona State Medical Association, held at Globe, Ariz., April 21-23, 1932).

I am pleased with the opportunity of appearing before this distinguished body of professional men. I appreciate the privilege of being here to discuss with you some of our problems, to talk over with you and secure your counsel regarding some of the things which are mutually troublesome. I feel that this discussion here today is of importance to the future of our state.

The Industrial Commission, at its inception six years ago, appreciated that success in carrying out the fundamental purpose of the Workmen's Compensation Law is, to a great extent, bound up in the understanding by your profession of the law and your co-operation with the Commission. The first matter acted upon by the Commission, then composed of C. W. Van Dyke, chairman, R. B. Sims (present chairman), and myself, members, was the issuance of a call to the physicians and surgeons of the state, asking their attendance at a conference for a discussion of the law and its operation. This meeting was splendidly attended. Following said meeting, and with the co-operation of our then consulting surgeon, W. O. Sweek, we drew up rules and a fee schedule regarding and regulating practice under the Compensation Law. The only change since that time has been toward a further liberalization of the fee schedule. The Commission felt that it should, in the interest of the injured workmen of Arizona, attract to our practice the best skill in Arizona. For that reason our schedule is high, probably about twice as high as the average schedules throughout the United States. The Commission does not now feel exactly as it did then. We do not now feel that we should attract to our practice the ablest men of your profession. We rather feel it is our incontrovertible duty to see to it that that type of surgeon, and that type only, be secured for such practice. If the Commission is blameworthy as regards its medical policy, the premise for such blame is its lack of courage—or of the knowledge how—to carry out this conclusion.

I am not going into a discussion of chiropractors and others of their class, or of some of the unfortunate results attending their treatment. The Commission appreciates that they have their place in the treatment of bodily ills, and by its rules and regulations has pretty well arranged for their remaining in said place. This discussion, however, is regarding industrial surgery and the Compensation Law and the problem of how to secure industrial surgeons and industrial surgeons of the first rank only, for the practice of industrial surgery.

Your profession appreciates that your profession is not an exact science. You appreciate that some of your members have a greater need of ability and skill than others. You appreciate that knowledge in your science is growing daily and that some among you are, to a greater or lesser extent, keeping up with said growth. Each of you in your experience has known cases unfortunately handled.

The Industrial Commission is also familiar with cases not skilfully handled—many of them. We find that some doctors will remove a semi-lunar cartilage of the knee with no resulting permanent dsability in 70 or 80 per cent of the cases, whereas other doctors performing the same operation will invariably end up with an unfortunate result. I will cite a couple of instances of inadequate handling of our cases.

Two or three years ago a man came into my office who, some six months previously, had had all tendons cut midway the phalanges of all the fingers. The wounds had been cleansed and had speedily healed without any infection. The attending surgeon had, however, not bothered about the tendons, and the man had a practically useless claw of a hand. Being an out-of-Phoenix case, it was possible to refer him to one of the Phoenix surgeons without giving offense. During the six months the tendons had all crawled down into the palm, and their repair and the repair of their sheaths necessitated the laying open of practically the whole hand. It was accomplished skilfully. That, however, does not excuse the first surgeon.

The sceond case was much more tragic. A man came into my office to see what his award would amount to. I had already looked over his file. I knew that he was a white American, 39 years old, with a wife and four children; that he had been carpenter foreman on the construction of one of the large buildings in Phoenix; had slipped and fallen some distance onto his shoulder. That he had immediately gone to a doctor of his own choice, who had reported to the

Commission a dislocated shoulder, temporary disability of two to four weeks, and prognosis of no permanent disability. The case ran along as usual without questioning by us, for about twice that period. The Claims Department then called the doctor who advised that the man had lost the use of his arm. We asked for more specific details, but he did not seem to know just how it had happened. Investigation and examination revealed that, following reduction of the dislocation, the surgeon had strapped this man's arm against his body and held it in that position for a period sufficient to cause injury to the brachial plexus beyond possibility of regeneration. I felt terribly sorry for the man—slender, wellbuilt, splendid type of the best class of American craftsman. I motioned him to sit down and started to figure out what his compensation would amount to. I heard a funny kind of sound and looked up; the man across the desk was gently sobbing, his eyes tight shut, tears running down his cheeks. I got up, went around and put my hand on his shoulder. He blurted out, "I want my arm. I want my arm." His right arm was hanging useless at his side. He went on, "I have to have my arm. My wife needs it, my babies need it. I've always had it. I have to have it." I wanted to tell him to loosen up a pick handle and go down and brain the doctor, but I couldn't. The only honest thing I did was to tell him, "I am sorry.' And so I say, the Industrial Commission does not feel they should attract to their practice the most skilfull of industrial surgeons, they rather feel that some way must be provided whereby they will secure such surgeons. I will revert to this again in closing.

The question of reports will be passed briefly—for, no matter what I say, it probably will not make much difference. The Industrial Commission, in order to function properly, must have reports. Making reports is a chore at any time; I have no solution. The report should state the exact pathology, describing it clearly; otherwise the Commission is in the dark and unavoidable delay is occasioned. Without exact pathology and intelligent prognostication, the case cannot be intelligently handled, nor can a proper reserve be set up. Reports are a necessary evil and the blanks ask questions often difficult to answer, but, even though an answer may now and again prove to be incorrect, they are on the whole of tremendous value to a Claims Department, and such value is in direct ratio to the definiteness of the answer. At the time of discharge from treatment, disability, if any, must be estimated. In estimating specific disabilities, the loss reported should be based entirely upon the loss of function of the member involved. The man's age, occupation, and so forth, are matters for the Commission to consider; the doctor's report should be his evaluation of functional disabiilty.

The next point I wish to discuss is the compensability or noncompensability of cases. An effect which is the natural and probable consequence of an act or cause of action is not an accident, nor is it produced by accidental means. The Compensation Law was designed to arbitrarily assess to an employer liability for disabilities resulting from accident arising out of, and in the course of, employment.

Rates of premium are predicated upon the legal interpretation of this phrase. The Industrial Commission is not an eleemosynary institution, nor can money be paid out except such money as has been received from premiums. No day is complete except some disabled man comes in and states—"Well, the doctor told me I am entitled to compensation," I submit that this is not the function of the doctor. The principal function of the Industrial Commission is the determining of the compensability or noncompensability of cases. It is the function of the doctor to advise the Commission and to advise the man what he thinks is the matter with him, what probably was the cause and what probably is the best way to effect recovery. But as to whether a condition is compensable—in view of the law—is a question for the Commission. I believe doctors who have had the most experience with the Commission will, without hesitation and unanimously, agree that the Commission leans backward in its liberality. The line of

compensability may not, however, be placed outside the law. The Compensation Law is a law, not an opinion.

It has been estimated that, of the $50,000,000.00 annually spent by the railroads of the country as their cost of industrial accidents, $25,000,000.00, or one-half, is a lsos due to improper and ineffective treatment. I do not agree that this is true, for, if true, it is a terrible arraignment of the efficiency of our biggest industry. Nevertheless, there can be no question but that effective and proper treatment would save untold misery, both immediate and future, to the thousands of men annually injured in this country.

Reconstruction surgery following trauma is now recognized as a specialized branch of your profession. This has in great measure been brought about through the economic pressure upon industry of the increasing benefits provided by our Compensation Laws. It is conceded that the regaining of function of an injured member is the patient's job; the job of the surgeon—following original skillful treatment—is on the psychological side, in the restoration of the patient's confidence in his ability to release the staff of compensation and to again return to society on his own. The members of your profession are naturally, properly, sympathetic. You, nevertheless, at different times have treated noncompensable traumatic injuries—a self-supportnig farmer not covered by insurance, we will say. Both for his sake—physical and psychological—and for your own sake, for the sake of a proper fee and for the sake of your reputation, you have permitted—you have urged him—soon, to resume his occupation. You have told him that it would cost him something in pain but that it would be well worth it to him in the long run. You have told him to keep a stiff upper lip and return to work. We appreciate that the picture is somewhat different when the man is on compensation and that probably his attitude commands your sympathy. The same underlying facts, however, obtain, and merit the same treatment. It is difficult to convince a patient that occupational therapy (exercise gained with an increasing unconsciousness of same, by some regular employment) is possibly the one thing which will, if started in time, make the difference between a real permanent disability and complete recovery. The fact that it may be difficult to convince the patient of this, does not lessen your obligation therein. Undue prolongation by the physician of the period of disability, unnecessarily instilling into the patient's mind fear of permanent disability, possibly invalidism, together with an assumption of effects from questionable causes—these things constitute the grounds for most of the misunderstanding between the Industrial Commission and your profession. It cannot be lost sight of in this connection that the average age of injured men is in the mid-thirties and that for them to lie off for a year, after a life of activity, will very frequently mean the activation of some disorder in no way connected with injury and yet equally disabling. The waiting for a final five or ten per cent improvement in the function of a member may be very disastrous to the rehabilitation of the man as a whole, and for the sake of the man himself it is better to report such functional loss as a permanent disability (for which disability the man will then secure an award) and allow the patient, without further delay, to resume employment. This also may forestall the growth of so-called traumatic neurosis, which may prove fatal to any return to usefulness. Such neurosis usually follows long-continued idleness on compensation, is superinduced by a desire complex for a continuance of compensation, impelled by a fear for the future.

In regard to the injured workman himself, I wish to say that there are surprisingly few actual malingerers. The chief difficulty we encounter is where disability is the result of a pre-existing or congenital condition; the disabled man's attention being called to the disability by a minor accident or incident. He honestly feels he is entitled to compensation. He does not rightly appreciate that the human machine will naturally wear out and that the Workmen's Compensation Law is not a pension law, or a law providing compensation for any or all disabilities, but that rather it is a law assessing to an employer, or his insurance car-

rier, liability for compensation for such disability as the employment may be held to have caused through accident. In this connection your profession can help infinitely.

The question of choice of physician by the injured has been touched upon briefly. In direct comment, I will say that the reasons why practically no compensation laws so provide, are both legal and humanitarian. Under the Compensation Law the employer is charged with the duty of providing treatment and is responsible, in compensation payments, for the economic result thereof. The employer has a more immediate economic interest than even the injured man, whose interest, economically, is aroused later. The law assures prompt, competent, and adequate service. More cannot be asked. And the employer pays for it. There is no question as to the therapeutic value of confidence and faith which a patient may have in his own physician. This confidence and faith are immediately reinstated, and, in fact, enhanced, by the knowledge that he is in the hands of the best man available. The question of inalienable rights, if such a right exists, has not been abrogated. The injured man still has permission to select his own physician. If he does, however, he must do as he did before the Compesnation Law became effective. He may waive this benefit which the law offers him, and pay for the service himself. In fairness you will agree that an employer or his insurance carrier, with their immediate economic interest, have probably theretofore arranged for more able and adequate attention than an injured man or his family will choose with their limited knowledge and under the stress of the occasion. The greatest danger of permitting so-called "free choice" by the injured man and without limitation, however, is the fact that such injured would be subject to the exploitation of unscrupulous practitioners, to the inroads of quackery and all other of the healing sciences by which the body politic is assisted or, maybe, afflicted. Ambulance chasing in its palmiest days could not possibly be any worse than the situation which would be brought about by such a change.

In starting a discussion of the retention of the Compensation Law in Arizona, I will quote from a talk made some years ago by a member of an industrial commission where conditions were practically identical with those in Arizona today. He remarked: "We had an unnecessarily high percentage of clever, able, more or less unscrupulous 'ambulance-chasing' lawyers. The more thoughtful of these welcomed a law providing for decent settlement of personal injury claims between employer and employee. Others fought and are still fighting. Some doctors—we are happy to say but very few —were the natural associates of such lawyers. This stamp of doctor is not the highest type either of man or doctor. An injured employee is entitled to treatment such as these doctors have not the ability to give. They do not get our busines and they are not pleased. A few lawyers and a doctor or two or three tried to repeal the Compensation Law a year ago. They failed, they will try again and fail. No state, no country, having once adopted Workmen's Compensation, has ever gone back to the old system."

If we revert to the old order what is the picture? In the first place, remember, negligence is a cold-blooded, cut-throat business at best. The question of payment for medical service is not important. In the event of winning a suit in court, the subject of whether the doctor is paid and how much, is usually a matter of negotiation with plaintiff's attorney, or the doctor may receive something from the injured man himself, but inasmuch as in only a small percentage of industrial injuries may liability be assessed to the employer, you may logically arrange with yourself for the performance of the most of this work gratuitously and for the prevarication, exaggeration, and misrepresentation with which tools you will be asked to deal if you expect payment for your services following long drawn-out and expensive suits in court. Ability and integrity, which are the things demanded today, will then be neither appreciated nor paid for. It should be borne in mind that practically all law is the result of compromise. In the creation of the Compensation Law almost everyone had to give up something. The employee, the employer, the lawyer—all

yielded. The doctor was not a party to the compromise. He gave up nothing. He gained a great deal. The doctor must now yield—not a thing which he has possessed—but merely an advantage he is now seeking to gain.

Now, we are right back exactly where we started six years ago. We are, properly, still striving for an ideal. In the contacts and relations of the Industrial Commission with the doctors, as in all human contacts, friction and disagreements arise. The fact that they do is not remarkable, it is the spirit with which they are met and disposed of which is indicative of the integrity of the parties thereto. It would be the same regardless of personalities. The inate honesty of the majority of intelligent persons may not be questioned. You and I both are intelligent. We have an ideal. The first problem is the avoidance of accidents. That ideal will probably never be reached. The next problem is obtaining correct and proper handling of the injured workman when he does have an accident. This ideal may be approached. It may be practically reached with your unselfish and honest co-operation. We appreciate that your business is the treating of the disabled. It is both natural and proper that you should desire as much of that business as you can secure. Our approach to this question is entirely different. Without disturbing the ethics of your profession, which, for the most part, are splendid, I must frankly state that the only interest of the Industrial Commission is not the providing of business to anyone—and I mean, exactly, to anyone—but rather our interest is the rehabilitation of the injured workman. I intimated a little while ago that the Commission should courageously proceed to direct all industrial medical cases in Arizona instead of possibly two or three per cent. (In Maricopa county, where we of necessity have to maintain office for our chief surgeon, we direct the city and county work to him). The Commission does not believe that directing of the medical case is the solution, nor do I. If we are able to combine the good points of both systems, everyone will benefit. The Industrial Commission will continue to permit the injured workman and his employer to select the doctor. To repeat, the Industrial Commission will continue to permit the injured workman and his employer to select the doctor. As in the past, we ask the doctor, if he recognizes the case as not within his best sphere, to refer it in turn, to another of your profession, or to call in consultation, our surgeon, or such surgeon as he considers advisable, and at such times as he considers advisable. Be fair with us. We are not a body wtih unlimited funds. We are willing—we want—to pay for the best treatment, but we want the best when we pay for it. Be fair, is all we ask. Be fair, and regard our problem.

DISCUSSION

DR. J. H. PATTERSON (Phoenix): Mr. Clingan's paper on Industrial Surgery and the Industrial Commission is very interesting and enlightening, and I am very happy that this important subject has been included on the program.

In the Salt River Valley, particularly Phoenix, there has been waging quite a bit of controversy concerning the Commission, its actions and its fairness to the physicians and patients. There has been quite a concerted action on the part of some labor unions, politicians, and lawyers, to have the act repealed. This I am heartily against. The act is a good act; in fact, it is one of the best industrial acts any of the states have. However, some of us no doubt find fault, and justly so, with the administration of the act at times. I think perhaps there is good reason for complaint against the Commission by some doctors and some workmen, that there has been discrimniation, not necessarily against some doctors, but rather in favor of one or two other doctors. There are even some accusations that the Commissioners are merely figureheads, and that the Commission is run by an individual outside, and that this accounts for one or two doctors getting so much work, they being connected with this particular individual. There are always two sides to a question, however, and I have no doubt that there are a number of instances in which the Commission can find plenty of fault with us as doctors. There are cases on record of trickery and dishonesty of doctors, and also, which is more sad, of neglect of patients, and sometimes ignorance in procedure, or at least inability to care for these cases.

I think it wise to clean our own doorsteps at the same time we try to alter other conditions. I think we should make our county societies more active and more dominant. As things are now, irregulars continue to thrive. Incompetent doctors continue to make blatant mistakes, and cause many sad patients to look askance at doctors in general and turn right around and solicit the irregulars for aid.

There is only one way in which we can arrive at

a satisfactory adminsitration of this law, and that is for us first of all to be honest ourselves, run out the irregulars and incompetents, and give the necessary and whole-hearted cooperation of the medical profession to the Commission. Then we can command and expect honest and conscientious administration.

I think there was a time in the past when we broke faith with the Commission, after we had agreed to work with and help them in the just fixing of compensaton and passing upon the type of work done in doubtful cases. This we must despise ourselves for, and in some manner seek to regain that confidence and cooperation, for this is the only way to run the thing, for the welfare of all concerned, and get away from the concentration of work to a few. However, this again opens up another avenue of argument and dispute. Industrial surgery is getting to be recognized as a definite specialty.

The fee schedule of this state is higher than in most states, and is, in my opinion, eminently fair, and I don't think that any of us will dispute this fact. While I am on this subject it might be well for us to know that there have been numerous instances of padding of our bills. This is unjust and dishonest, and we must cooperate wtih the Commission on this point. The ability of the Commission to follow our cases depends upon the promptness and accuracy of our reports. In my office I try to make it a religion to keep my reports accurate and send them in promptly. I think we will find that our insurance companies expect this and appreciate it. Our bills will also be paid much more promptly.

There has been a great deal of controversy and hard feeling shown by some injured workmen toward what they have felt was inadequate compensation on disabilities sustained. But as long as we have injuries and compensation, we shall have disputes and dissatisfaction. I think we will all agree that the Industrial Act has done much toward the betterment of working conditions and safeguarding of the workmen against loss and damage through these heretofore poor working conditions, thus eliminating lots of nasty law suits.

There has been a great deal said about the right of an injured workman to choose his own doctor. In discussing this phase, we may cite that part of the law concerning this. The law states that the Industrial Commission, as carriers, or other insurance organizations as carriers, agree to furnish medical and hospital care to the injured workman. This makes it as broad as it is long. It does not tell you that you may choose your own doctor, nor does it specify that they are to select the doctor. So we must interpret it literally, thus giving him the privilege to choose if he insists upon it. However, we must safeguard the carriers by seeing to it that only qualified men are available to render such service.

Again, in closing, let me stress the importance of close and adequate cooperation of the medical fraternity with our Commission. I think it most important that our Commission be rendered free of all political taint, should there be any present. It should be a non-political organization.

I should like Mr. Clingan to clear up in my mind a question which keeps coming to me. I hear that, at the site of the Boulder Canyon Dam, on the Arizona side, where money is being paid to Arizona for insurance protection, these injured wrokmen are being sent, in many instances at least, to California for care, and that deals are being made, in at least some of these instances, with privately employed doctors and private institutions, such as the Southern Pacific Hospital.

I have enjoyed Mr. Clingan's paper immensely, and feel that all of us undoubtedly have a much clearer conception of the workings of the Commission, and also of their many difficult problems. I do not believe in destructive criticism, but rather feel that constructive criticism is good and healthy for us all, and that we should all pitch in and clean our own house, do our part in cooperating with the Commission, then we can demand and get impartial treatment and satisfaction. Then we hope to have everybody happy.

DR. R. D. KENNEDY (Globe): There is another phase of this problem: that of the honesty of the employer, when he has one of a few men injured. For instance, I was called one night to see a man who was hurt as he was hurrying home to get his house ready because his wife was coming home. A few days later he came in with a statement from his employer that he fell off a ladder while at work. And again, a man came in with a boil on his hand, declaring to me that he got a sliver in there while at work and that was the cause of the trouble. I had no way of proving that there had been no sliver there, but the boil looked like a great many others which were not caused in this way.

MR. CLINGAN: The doctors can be indifinitely helpful in this connection, Dr. Kennedy. Insurance may cost an employer $50.00 or $60.00 a year and over a number of years he may have no accidents. He feels that he is not getting his money's worth, not appreciating that his experience is not broad enough to have entitled him to an accident and that any accident, in anywise serious, would probably cost considerably in excess of his total payments theretofore. Many of the smaller employers consequently "put in" with their employees in the event of some non-compensable injury, and endeavor to secure compensation. They short-sightedly thereby increase their own rates, as rates are and must be predicated on cost of injuries.

On the other hand, there are many employers who are not "compensation conscious." They believe that, unless the injury can be definitely traced to the negligence of the employer himself, the employee should carry the load. They do not appreciate that, under the compensation laws, and properly, industry must be charged for the cost of its mutilation to the human machine. Such employer has but little conception of the objectives of the compensation law and its functioning.

DR. N. C. BLEDSOE (Tucson): As an industrial surgeon in this state for twenty-seven and one-half years, I know of the care that injured men receive. The surgeon's one aim has been to get the man well, to rehabilitate him so that he can get back to work. The Commission has been most liberal in its help. Previous to the existence of the Workmen's Compensation Law, there were many cases of injustice. The law in Arizona is the most liberal compensation law that there is in the United States. The men are employing its results here more than workmen in any other part of the United States. The Commission does everything it can for the workingman, to rehabilitate him and make him again a useful citizen. I have found the Commission absolutely fair in all its dealings.

MR. CLINGAN (closing): I thank you, Dr. Patterson, for your courtesy, and suggest I may well withdraw my paper and substitute yours therefore. It covers the field admirably.

As regards the treatment of employees of the Six Companies; the Companies, in compliance with the provisions of the Compensation Law, are providing their own medical attention and have their own hospital in Boulder City. None of the men employed on the Arizona side live on the Arizona side, and, in fact, practically all of the employees of the Six Companies, whether working on the Arizona side or the Nevada side, live in Boulder City, and are carried to and from their work daily by the company. The Six Companies originally had a contract with a Las Vegas hospital but now have their own. All that the Industrial Commission may do is to insist that the men receive adequate and proper treatment. We have our own representative constantly at the dam to assure this fact.

RUPTURE OF THE PREGNANT UTERUS, IN TRIAL LABOR

PREVIOUS CESAREAN SCAR INTACT REPORT OF A CASE

C. E. YOUNT, M. D.
Prescott, Arizona

(Read before the Forty-first Annual Meeting of the Arizona State Medical Association, held at Globe, Ariz., April 21-23, 1932).

Operative obstetrics is calling forth much adverse criticism from many of our best obstetricians and gynecologists. Their evaluation of morbidity and mortality statistics furnishes data worthy of the most serious consideration at this time by the entire medical profession, more particularly those practising obstetrics.

Of all the operative procedures, cesarean section probably receives the most censure. C. Jeff Miller, in an address in 1928, said that, "An operation designed as a life saving measure has become a sort of a medical boomerang, carrying with it a mortality which, since it is so largely avoidable, is criminal rather than tragic."

It is not my purpose to attempt in any way a refutation of the arguments of those who have so ably presented the case against indiscriminate cesarean section. Their effort to curtail any operative procedure which "carries in its abuse death and invalidism" is most commendable. On the other hand there may be men who, like myself, facing similar problems, may be confronted with a situation at rare intervals wherein a cesarean section is the conscientious, if not the classic, obstetric indication. In such an event, this case report might be of interest, for it illustrates the desirability, as well as the necessity, for prenatal care in all cases. It establishes the dictum that trial labors in pregnancies following cesarean section should be supervised with meticulous care. It presents one case as an exception to the statement that, "by increasing the operative incidence in obstetrics, maternal mortalities have been materially raised——" (Polak and Clark).

It recounts an experience in which the old classic cesarean section scarcely averted an obstetric tragedy.

I shall ask your indulgence while I digress far enough into the history of American medicine to reveal certain fundamental factos which may in part explain the trend to the "operative furore" which has invaded obstetrics. Morbidity and mortality in cesarean section result largely from some form of infection in the uterine incision. After reading the editorial in the March 12, 1932, Journal of the American Medical Association, apropos of Paul de Kruif's proposed boycott for "any physician in whose practice there occurs a death from puerperal infection," I cannot resist the temptation to strike at some of our shortcomings.

Let us go back to 1911 when J. Whitridge Williams, professor of obstetrics, Johns Hopkins University, sought accurate information on medical education and the midwife problem in the United States.. A questionnaire containing some fifty questions was sent to the professors in 120 medical

schools giving a full four-year course. Forty-three professors, representing schools in every section of the country, were good enough to reply. I will quote only a few deductions: "Most serious of all, that a large proportion (of the professors) admit that the average practitioner, through his lack of preparation for the practice of obstetrics, may do his patients as much harm as the much-maligned midwife. Several professors admit that they are not prepared to perform cesarean section. Consider that such a condition of affairs means that the professor is merely a man-midwife, who is unable to carry a complicated case of labor to its legitimate conclusion! Or, imagine the effect on a patient who places herself in the hands of a professor of obstetrics in a respectable medical school, when she is told that he can conduct the case satisfactorily if it is ended by the unaided efforts of nature, or merely requires some slight interference; but in case radical interference is demanded he will be obliged to refer her to a gynecologist or surgeon. Think of the impression such an admission must make on the student, who cannot be blamed for believing that obstetrics is a pursuit unworthy of broadly educated men, but is suitable only for midwives or physicians of mediocre intelligence. Most of them admit that their graduates are not competent to conduct operative labors, while several state that they deteriorate rapidly in technic after leaving the medical school."

As I contemplate this article, I wonder if it may not have been a whip which helped to lash the "professors" into taking the bit in their teeth, for after eighteen years we find another professor of obstetrics (Polak) stating, "In obstetrics teaching, what is called progress has been largely along surgical lines. Some say that obstetrics has become a surgical specialty. To this we cannot subscribe, for the bulk of all deliveries are, and always will be, conducted by the general practitioner, and it is the clean practitioner, who practises aseptically and conservatively, who has the lowest morbidity and the smallest mortality. As we see it, much of the present-day mortality and morbidity is directly the result of the teachings of some prominent obstetricians who have been busy inventing operative procedures to control the onset of labor, or shorten or eliminate the second stage of labor in all women at term; another cuts the perineum of every primipara, while still another does a section on every tenth woman and a version on the other nine. Most remarkable of all is the teaching of one of our leading obstetricians who classes all labor as pathologic and advocates rapid delivery with forceps through a cut pelvic floor as soon as the head has passed through the cervix, following this by manual removal of the placenta. It is stated that the routine use of solution of pituitary improves the mechanism of the third stage. The popularity of cesarean section has outgrown all bounds and it is being done for almost every complication of delivery, as well as for many of the complicating diseases of pregnancy. Recently we have been advised to do rapid extraction in breech cases as soon as dilatation is complete; while another professor induces labor with bags and advocates digital dilation. Such teaching is bad teaching alike for expert or for novice, and when such advice is put into the hands of the general practitioner by men of reputation of whom he has heard through their publications, and for whom he has the respect that the reader often gives the unseen author, it becomes the underlying factor in maintaining the present relatively high obstetric morbidity and mortality rates."

Or, again, take Williams' criticism of DeLee's teaching concerning his prophylactic forceps operations, both of them among our ablest and most popular teachers of obstetrics, "DeLee takes a more radical position, as he believes that prolonged pressure of the fetal head against a more or less rigid perineum frequently results in serious injury to the cerebral tissues, and recommends the performance of what he designates as 'the prophylactic forceps operation.' In this procedure, as soon as the head rests firmly upon the pelvic floor and has begun to part the pillars of the levator an muscles, a deep lateral incision is made through the perineal and vaginal tissues, which extends into the levator an if the disproportion promises

to be great, following which forceps are applied. He considers that prompt intervention adds greatly to the safety of the child, relieves the patient from a considerable part of the strain incident to the second stage of labor, and leaves her genitalia in such condition that the occurrence of outlet relaxation in the future is reduced to a minimum. In his skilful hands, these objects are no doubt accomplished, but I am confident that the results would be disastrous were his suggestions generally adopted."

So we might continue ad infinitum, but let these opinions suffice; they are authoritative and representative. From them we deduce a serious lack of uniformity of indications and obstetric procedure among those who teach obstetrics. Standardization in obstetrics may be as undesirable as it is unattainable. Yet the present confusion calls for something! Shall we call it an obstetric code, to be evolved and subscribed to by those teaching and practising obstetrics?

Now let us return to our subject. "Once a cesarean section always a cesarean section." Williams says that this is an exaggeration; DeLee is more conservative, stating that a decision cannot be reached until we know how many cesarean uteri rupture in subsequent labors. Considerable work has been done on the study of the scar in this muscular organ, with its mucous lining and its partial peritoneal covering. We will consider the immediate and remote conditions in the scar—infection in the uterine wound is the chief source of morbidity and mortality, although not always a precursor of a defective scar. The location of the incision, the suture material, method of suture, and infection from below, have all been blamed for bad results. Quoting King: "Many observers have noted at cesarean operations, which were the second undergone by the patient, thin cicatrices which might have ruptured had labor been permitted. Thus, Harror, at the New York Lying-in-Hospital, in fifty repeated cesarean sections, noted thin scars in four cases, partial rupture in two, and complete rupture in two. Van Leuwen found twenty thin scars reported in 117 collected cases in which the condition of the cicatrix was noted. Gamble states that, of fifteen cases in which the uterus was removed and in which definite information as to the former puerperium was available, the following points were noted: Of seven cases with previous febrile puerperal periods, no trace of the scar could be found in six instances, and it was only slightly thinned in one specimen. In eight cases in which there was no fever after previous operation, the scar could not be located in three specimens; while healing was good in three, fair in one, and poor in one. In our (King) series of ten second cesarean sections, the cicatrix was noted or recorded in five instances. These thin scars are the dangerous ones. It is universally conceded that a well-healed scar will stand the strain of subsequent labor. In fact, in this connection the term 'scar' is really a misnomer, as in such cases healing takes place by muscular regeneration across the gap, rather than by the formation of connective tissue." King, evaluating Holland's collection, records ninety-six patients who were allowed to test out the cicatrix with 18 ruptures, or 18.75 per cent; and, applying the same analytical methods to Gamble's report, he obtained 5.5 per cent. Holland's figures represented twenty-six different hospitals; Gamble's, one well-organized clinic. As a working basis, then, we may assume that the incidence of rupture in repeated cesarean sections after the test of labor, will be somewhat between 5 and 18 per cent. Williams' figures are very much lower, 1 to 4 per cent; but I doubt if they represent the analytical scrutiny of King.

MORBIDITY IN CESAREAN SECTION

Polak[1] states: "Our present morbidity records are unreliable, for the average institution keeps the maternity patient only ten days. A few services have lengthened the puerperal stay to two weeks, and almost all accept and record as their standard of morbidity a temperature of 100.4° F. on two successive days not including the first 24 hours after delivery. Such a standard, without a follow-up, can give no adequate index of actual morbidity. We have repeatedly seen a temperature of 100.4° to 101° on one day, or on the third and eighth days, in women who were discharged afebrile because these tem-

peratures did not occur on two successive days; yet the same women have returned to the hospital with extensive exudates or with pelvic abscesses."

Lewis[8] reports morbidity on 887 cases of classical cesarean section done at the Cook County Hospital; 13.8 per cent had temperatures over 104°F., 24.1 per cent had temperatures from 104° to 102°, 45.8 per cent had temperatures from 102° to 100°, and 16.1 per cent had temperatures below 100° F.

Frequent causes of morbidity are acute dilatation of the stomach, peritonitis, ileus, uterine abscess, infection in the uterine scar, thrombosis of the uterine and pelvic veins. Polk notes that "there is a high morbidity even in the clean cesarean section, very much higher in fact than is common in operations for pelvic tumors such as fibromyomata and ovarian cysts. This is due to the presence of infective bacteria in the cavity of the puerperal uterus, which migrate from the vagina into the interior of the uterus, through the open cervix."

MORTALITY

Thirty-seven years ago, Lusk[9] stated that, "Until a very recent date the cesarean section was justly regarded as one of the most hazardous operations in surgery. Dr. Harris (1888) gathered with great industry the histories of 153 cases performed by the older methods in the United States, fifty-six of which, or nearly 37 per cent, ended in recovery. Under this showing, it will be seen that at best fully half of all cesarean operations ended fatally. The responsibility for these results was due, in the first place, to septic infections, the evils of which were especially experienced in hospital practice, and to the postponement of operation until death impended."

Whatever criticism there may be today of the furore operativus of obstetricians and general surgeons in relation to cesarean section, we have to admit a lessened mortality. As Mosher[7] very aptly said, "It is an established fact that the scope of any surgical procedure widens as the technic is perfected and as the morbidity and mortality are thereby reduced. Cesarean section is no exception to this rule."

Williams thinks the mortality figures are close to 10 per cent for the whole United States. His rate in 349 operations, classified as conservative, low, and radical sections, gave a gross mortality of 3.4 per cent. Eliminating eight cases in which death was not due to operation, his rate was 1.7 per cent. Contrast these figures with those given by King from the Charity Hospital, New Orleans, "Where all of these patients (117) had had vaginal examinations or attempts at delivery before operation," and where maternal mortality was 13.6 per cent.

C. Jeff Miller collected 9782 cases, from fifteen different sources, with an average maternal mortality of 7.36 per cent. He stated, "These figures have been collected casually from a casual reading of the literature."

Regardless of the many factors influencing mortality, there is one which I wish to repeat; it is the "time limit." Williams' words are axiomatic: "No matter how good the operator, or how perfect his technic, it appears that the mortality, even in apparently uninfected women, will be low only when the operation is done at an appointed time before the onset of labor or within a few hours after the first pains, and that it will increase progressively with every additional hour of delay." Holland's[5] figures, based on 1953 sections in Great Britain (1911 to 1920), show an operation mortality before labor of 1.6 per cent, increasing to 14 per cent after the induction of labor, and to 27 per cent after attempts at delivery by forceps, and so forth.

CASE REPORT

Mrs. E. K., white, female, age 36, weight 98 lbs., height 62 inches, a twin, youngest of ten children, weight at birth, 4 lbs.

Family History: Father died at 72, old age; mother died at 71, kidney trouble; three sisters and one brother living and well; two brothers died in infancy; one brother was shot, age 57; one sister died at 22, of pneumonia following childbirth; one sister died at 3 months, of pneumonia following an attack of pertussis; husband living and well. weight 218 lbs., height 71 inches.

Menstrual History: Matured at age of 17, irregular, considerable dysmenorrhea.

Past History: Measles and pertussis in childhood, croup several times, influenza 1920; cystitis 1929, in early part of this pregnancy, was treated and cleared up.

Present Condition: Last menstruation, Jan. 23,

1929, had rather stormy pregnancy, with vomiting throughout entire gestation, but most in first six months. There was never any serious acidosis, albuminuria, or high blood pressure. During last months had slight edema of the ankles, but it was not traceable to kidneys. Admitted to hospital at 11:15 p. m. Oct. 22, 1929, in labor. Condition good for pregnancy at term. Labor pains good quality and rhythm, on admission.

She had had the usual prenatal care. Pelvic measurements: transverse, 26 cm.; external conjugate, 18 cm.; internal conjugate, 12½ cm.; true conjugate estimated 10 cm. Presentation right occipito-anterior, head remaining high at the inlet.

After six hours of hard labor the pains faded out and, on rectal examination, it was found that the head was floating at the inlet. After consultation, cesarean section was decided upon. Only rectal examinations were made.

Physical Examination: No evidence of any abnormalities; lungs had no lesion, respiratory sounds clear throughout; heart, no valvular lesion, no evidence of enlargement of the borders, rhythm normal, pulse 74 on admission to hospital; temperature, 98.4° F.; abdomen large, pregnant uterus with head high, floating at the superior strait. Catheter specimen of urine showed albumin 2 plus, and a few pus cells. Blood count: white cells, 8,550; hemoglobin 80 per cent.; polys, 73; slight anisocytosis.

Operation: In ether anesthesia; midline incision 2½ inches above umbilicus to pubis; uterus delivered, towels holding intestines back; uterus incised high on fundus; child extracted feet first; (pre-delivery diagnosis of right occipito-anterior position confirmed); placenta extracted; manual compression of the uterus to control hemorrhage, also 1 c. c. obstetric pituitrin injected into uterine muscle. Incision in uterus closed by three rows catgut sutures; No. 1 ten-day chromic for submucous and muscular rows; plain catgut for peritoneal surface; good contraction obtained. Abdominal incision closed by No. 1 plain catgut, double, to peritoneum, same to fascia; retention sutures cross-tied in pairs, four pairs used over gauze. Appendix and other organs not examined. Dermal to skin. Patient returned to room in good condition. Time of operation, 35 minutes; baby delivered in four minutes.

Baby: male, weighing 8 pounds—began to breathe as soon as delivered. Note: For a few moments during second stage of anesthesia, the mother was deeply cyanosed; the fetus which had been very "quiet" up to this time, was seen to gyrate rapidly, to kick rapidly and forcibly in the uterus for several seconds. When delivered, there was some frothy mucus in his mouth, but he required practically no resuscitation.

Convalescence: Temperature reached 101.4° at the end of the first twenty-four hours and again on the fourth day. There was a slight afternoon rise of temperature during her two weeks in hospital. She returned to her home on the fourteenth day after operation. Convalescence was satisfactory except for the rise of temperature noted. The baby was placed at the breast on the fourth day. She regained strength rapidly and continued to nurse the baby for five months with some supplementary feeding.

Second Pregnancy: Fourteen months after first delivery by cesarean section, she became pregnant the second time. This gestation was less annoying than the first, with less vomiting and general aches and pain. She, however, complained of pain and soreness in the abdomen; its location tended upward as the pregnancy advanced. (See operative findings.) Careful prenatal care was given throughout and, in the last month, x-ray was taken, showing the fetal head at the brim. Careful pelvic measurements were again taken and, as these seemed ample, except the obstetric, which was very slightly less than the normal, it was decided after consultation to give her a trial labor with the patient in the hospital under careful supervision. Admitted to hospital Sept. 27, 1931, in labor at term. After six hours of labor, observing no progress and the head still floating at the inlet, consultation was obtained. Consultant's comment was as follows: "Find she is small frame, thin abdominal and uterine wall; constant pain with head not engaged; pregnancy at term; no progress in six hours of labor; danger of uterine rupture; recommend that cesarean section be done at once."

Pre-operative diagnosis: Dystocia continues after six hours of trial labor (previous cesarean section 23 months ago.)

Operation: Operation was begun with patient still in light ether anesthesia; midline incision to left of umbilicus beginning about three inches above umbilicus, carried down to within about two inches of pubes; skin, a little fat and fascia, no muscle encountered in the incision. On opening peritoneum, a blood clot about three inches long and three-quarters of an inch wide came through the incision. Incision enlarged, hand passed up over the fundus and in doing so a finger engaged in a rent in the uterus. Incision enlarged rapidly upward, uterus delivered and, under slightly increased pressure, the uterus being in tonic contraction, the rent at the fundus lengthened to about six inches, with the placenta herniating as the rupture widened. This rent began to the right of the median line, at least an inch and a half from previous scar, which was only a grey thickening in the peritoneal coat, and spread out towards the right side to about two inches below the round ligament insertion. The uterus was not incised, but the placenta delivered through the rupture, followed by the sac with the child, membranes then ruptured and child, male, delivered. Respirations began promptly. Maternal hem- in pairs over gauze pads. Normal saline, 400 c. c., orrhage rather severe for a few seconds. Obstetric pituitrin injected into uterine muscle as the fetus was delivered. Child in left occipito-anterior position with head floating at the pubic rim. There was a band of adhesions from the first operation anchoring the transverse colon to the anterior of the uterus (see history of gestation). The rent in the uterus was sutured with plain catgut No. 1,

double two rows, reinforced in several places; uterine muscle was estimated to be about one-half the thickness that it was at the time of the first operation and two layers of suture material, instead of three, as in first operation, were used. The adhesion of the transverse colon to the uterus was clamped and cut and the colon liberated. Catgut No. 1 to peritoneum, double, second row of the same material to fascia; silkworm gut retention sutures was given during the operation, needles under both breasts. Patient placed in semi-Trendelenburg, after child was delivered, to lessen the possibility of shock. Time of operation 34 minutes, baby delivered in 3 minutes.

Note: The patient had a very hard contraction of the uterus while still in her room, just before bringing her down to the operating room. This contraction was very painful and may have been the beginning of the rupture found at operation. Further, the anesthetist noted that the uterus was in a condition of tonic contraction, i. e., no uterine pains after the patient entered the operating room, but a constant contraction of uterus. In retrospection, it is evident that a few more severe contractions, had they occurred, would doubtless have resulted in a fatal hemorrhage* as the placenta was immediately under the rupture. The rupture at its nearest point was not closer than one and a half inches to the scar of the first cesarean section. Returned to her room, color good, pulse fair volume, rate 104.

Measurements of baby's head: Occipitomental diameter, 6¼ inches; bi-parietal, 4½ inches; occipitofrontal, 5¾ inches.

Convalescence: Temperature rose to 102° on second day after operation, and 101° on fourth day, normal thereafter. Satisfactory convalescence. Nursing baby at present, after six months.

*King's case 1: "The patient was placed on the operating table as trouble was feared. Rupture of the scar occurred, and the patient died before the abdomen could be opened."

SUMMARY

That there has been no improvement in maternal mortality records in the United States in the past ten years (1929) should be a cause for serious reflection and resolve. Yet, with all our delinquencies, I believe that "At this time obstetric care in the United States for the vast majority of women is as good as, if not better than, in the majority of civiized countries.'"

Our experience does not corroborate the statement that "all the reviewed statistics show that from 90 to 95 per cent of all labors terminate spontaneously" (Polak and Clark).

Before practising the art, our obstetric conscience should have developed at least to the point of distinguishing between "meddlesome midwifery" and obstetric indications; then may our conscience be our guide.

Obstetrics is often emergency work. When suddenly confronted with intervention, whether manual or instrumental, the modern obstetric delivery room or operating room represents a haven of safety.

Obstetrics is a science as well as an art, demanding faithful obedience to all of its mandates. An obstetric code, universally accepted and practiced" is a consummation devoutly to be wished."

We believe that obstetric consultations should be held more frequently before labor, particularly when the prenatal study points to a probable dystocia.

The results of cesarean section must always be considered as immediate and remote, and the prognosis honestly and fairly stated on this basis.

The percentage of rupture in the scar of the low cesarean section (laparotrachelotomy) will probably equal that in the classic operation when the technic of the low operation is as generally mastered and practised.

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DISCUSSION

DR. F. B. SHARP (Phoenix): Doctor Yount is to be complimented upon the presentation of a very interesting case and the reading of an excellent paper. The case presented varies from the usual order in that the uterine scar of a previous classic cesarean remained intact while the organ ruptured elsewhere. Obviously, the merits of the case should not initiate a discussion of rupture of a previous cesarean scar, in spite of the relative frequency of such an emergency.

Consideration of Doctor Yount's case should review for us several phases of obstetric principle and thought, even though widely separated. Rupture of the lower uterine segment and a knowledge of its production, emphasizes the mechanism of cervical effacement and dilatation, and later retraction upward by the action of the longitudinal muscle fibers of the corpus. Incarceration of the cervix between the head and pelvis, in cases of disproportion and the persistence of hard contractions, throws a terrific strain upon the passive, thinning-out lower segment. A prolonged second stage, even with complete retraction of the cervix, may lead to rupture. In the same thought, we can not forget the importance of anomalous presentations and the consequent greater strain upon a particular part of the lower segment. Especially is this true when there is weakening of the wall by greater invasion than normal by fetal elements, with rupture at the placental site.

The subsequent welfare of this patient amply demonstrates the advantage to the parturient woman by observation in a well-equipped hospital whenever possible, and by a conscientious, competent physician. I have long insisted that a patient in labor should be continuously attended by her physician, or at least by a nurse under his supervision and trained to recognize early a pathologic trend.

Finally, there is again the reminder that the multipara is as frequently beset by danger, or more so, than the primipara. Even without the scar of a previous cesarean, and with the history of easy labors, there is more than the possibility of serious trouble, due to increasing size of her babies, anomalous presentations, or of tumultuous and precipitate labor, the extensive tearing through and beyond of old cervical and perineal lacerations, lessened elasticity due to increasing connective tissue elements, hemorrhage, toxemia, and numerous other irregularities.

Of the four cases of uterine rupture which have come under our observation during the past three years, all were multiparas. Seen in consultation were two ruptures of previous classic cesarean scars, one at eight months and occurring without premonitory symptoms, one after twelve hours of hard labor, the physician in charge not having inquired as to the nature of the abdominal scar, and a third rupture in a woman with a pendulous abdomen. In this case, of course, the rupture occurred posteriorly. The fourth case was in our own practice, in a woman who gave a history of rapid deliveries with three or four hard pains. She presented upon examination a badly scarred cervix, and at delivery ruptured the lower segment through a low-lying placental site, at the third pain, in addition to spontaneously amputating about half of the cervical ring. Hence, it should be difficult for us to view the the parturient woman with anything but the utmost interest.

DR. C. E. IRVIN (Miami): This matter of the "obstetric conscience" is of vital importance. The infant mortality alone is sufficient to show the type of man handling any particular case. In order that conditions may be improved, it is necessary that women and their husbands learn the importance of having expert care at this time and be willing to pay fees commensurate with the service rendered.

DR. C. R. SWACKHAMER (Superior): I wish to express my deep appreciation of this paper of Dr. Yount's. It is another of his splendid efforts to keep the developments in the practice of obstetrics before the attention of the State Association.

DR. YOUNT (closing): There are two points of special interest I wish to repeat: first, we actually witnessed a uterus in process of rupture; second, the rupture was distal to the scar of the previous cesarean section with hernia placentae; however, the whole uterus appeared thinner, even with the uterus well contracted (during suturing), than it did at first section.

CASE REPORTS

1. Adenocarcinoma of the Head of the Pancreas.

2. Diabetic Coma.

JAMES J. GORMAN, M. D.
El Paso, Texas

(Presented before the El Paso City-County Medical Society, March 28, 1932.)

The purpose of this discussion is to present two cases of pancreatic pathology. The first, a case of adenocarcinoma of the head of the pancreas, presenting rather a typical chain of symptoms and findings of this condition. The second, a case of diabetic coma, presenting symptoms, though not uncommon, still not encountered too frequently to be interesting and to be reviewed.

CASE H-1-714. Female, age 63. Examined Feb. 1, 1932. Chief complaint: jaundice.

Present Illness. Onset about January 10th, with inability to digest her food. The following day she developed a severe pain in the epigastrium, which was severe and continuous for about one week, and has continued until the present, but, in general, not as severe, though there is a dull aching present at all times. When the pain is worse there is radiation to the back and upward to the right shoulder. Relieved somewhat by pressure applied to her back. She was awakened on the night of Jan. 31 with a severe pain which lasted about two hours. She obtains slight relief from food, which lasts about fifteen minutes. After that the pain is aggravated. Jaundice developed Jan. 17 and has grown progressively worse. During the first week of illness the patient had about one degree of fever and her pulse was very rapid, evidenced by palpitation in the epigastrium. Gas comes on shortly after meals and she has noticed transient generalized pain over the abdomen, attributed to gas. when present appearing about 2 a. m. She has a "winding feeling' passing upward beneath the sternum. relieved by belching if she takes soda. The day following the appearance of jaundice, she became nauseated and vomited undigested food. The stools have been clay colored and the urine of an extremely dark orange color. Only once has there been a slight color to the stools, but the urine has remained constantly dark. She has an empty feeling in the epigastrium, which she ascribes to inability to digest her food, and she has become very weak. Loss in weight has amounted to several pounds. but exact amount not known. All foods seem to disagree except beef juice. especially is this true of milk and fruit juices. Has always had a delicate stomach, which has necessitated close adherence to a diet regulated by herself. This condition has been noticeably affected by nervousness. Beans. peas. salads, raisins, prunes, apples, pastries, fresh tomatoes, bread, and coffee, have disagreed for a considerable time.

In October, 1931, the patient was advised to have her teeth repaired, but the grinding caused her to become very sick and nervous. After three attempts she discontinued further attention. In December. 1931, she had a severe attack of food poisoning lasting three days, which began with a terrific headache, pain in the back, and blisters in her mouth. Similar symptoms were noted by others who ate the same food.

General History. Patient seldom has a headache except on waking during the summer months. Notices a soreness of the eyes frequently. Tonsils have been removed. Teeth are known to be bad. Has not felt well since two teeth were extracted, with great difficulty, in the fall of 1931. Has had chronic inactive pulmonary tuberculosis for many years. Last examination in 1929. Has considerable cough and expectoration in the mornings. Is of highly nervous temperament.

Past History. Irrelevant except for pulmonary tuberculosis, cervical gland tuberculosis, and influenza.

Physical Examination. Patient is fairly well developed and nourished. The skin is very deeply jaundiced. Sclera shows a very deep greenish-yellow discoloration. Pupils react satisfactorily. Several teeth missing, others appear bad, several filled, and has a poor chewing surface. Heart sounds are rapid. Lungs: Dullness over right upper. Expiration is very harsh, and of tubular quality. Numerous sibilant and sonorous rales heard over the right upper. Blood Pressure: 156/94. Abdomen is about level with costal margin. and with respiration there is a visible mass noted in the right upper quadrant, held somewhat tense throughout. The liver edge is palpable about three finger-breadths below the costal margin, and is tender. There is a second mass palpable, apparently soft, but not tender. in the region of the gallbladder. Just to the right and below the pylorus. there is a stony hard mass about the size of a lemon. which seems to be irregular and not tender.

Laboratory Examination. Temperature, 99.0; pulse. 82; white blood count, 10,900; polys, 74; tr., 3; L. M.. 9; S. L., 14. Urine exam.: sp. gr., 1,030; alb., slight trace; sugar. negative. Dark, amber color. Stool, clay colored. Gastric exam: (45 min. exam.) Free Hcl. 36; comb. acids. 16; total acids, 52. No bile obtained by biliary drainage.

X-ray of stomach (Dr. George Turner). The stomach is normal in size and outline. There are no filling defects. It is hyper-motile and empties rapidly. The cap is large, but shows no defect. The stomach is displaced to the left because of the liver. The gallbladder is very large. and casts a shadow. There is no evidence of stones. Eighteen hours after taking the meal, a large part remains in the small bowel. The cecum is normal in position and outline. The appendix was not visualized. Cecum is freely movable and not tender to manipulation.

Diagnosis: Carcinoma of the head of the pancreas.

Patient was advised as to surgical intervention being the only possible treatment. Dr. R. L. Ramey

and Dr. E. A. Duncan, examining the patient in consultation, likewise advised operation, and the patient was referred to Dr. Ramey for operative procedure. On opening the abdomen, the gallbladder presented itself of extreme size. There was no apparent involvmeent of the liver, but it was enlarged. The common duct was several times its normal diameter. Complete examination of the cystic duct was not entirely satisfactory. There was a hard mass at the region of the head of the pancreas. Owing to the poor condition of the patient, external drainage of the gallbladder was instituted, with intention of performing secondary operation of cholecystogastrostomy or enterostomy at a later date.

Two days following the operation the jaundice increased. but on the third and fourth days stools were liquid and of a yellow color; however, the urine remained dark. The patient's course continued unsatisfactory and she expired on the ninth day following the operation. Complete postmortem was not obtained, but permission was obtained for removal of the pancreas by Dr. McBride, and it was delivered to Dr. Waite for examination.

Pathological Report. Pancreas was considerably thickened about the head from induration and scarring. Microscopic examination of a section taken from the indurated area showed a new growth made up of adenomatous tissue invading the surrounding structures.

Pathological Diagnosis: Adenocarcinoma of the head of the pancreas.

DISCUSSION

In a recent report by Stillman of twenty-two cases of cancer of the pancreas admitted to Roosevelt Hospital from 1918 to 1928, out of a total admission of 57,336, he gives the age incidence as mostly from fifty to sixty-seven, duration of condition six months or less, often only a few weeks. Loss of weight appeared in 79 per cent of the cases, pain in 73 per cent, jaundice in 63 per cent, weakness in 61 per cent, a palpable mass in one-third of the cases, and other symptoms less frequently. I. J. Walker reports fifteen cases encountered in twenty-two months at the Boston City Hospital, with average age of 58 and duratoin of disease four and a half months.

The symptom of pain varies as to the location of the disease, and is regarded as being the result of pressure on the celiac plexus or on the mesentery direct. It is, therefore, frequently absent or insignificant in involvement of the head, but, with involvement of the body, is severe to the point of agonizing, with radiation to the back, between the shoulder blades, and it is uninfluenced by food, but may be associated with vomiting and fullness in the stomach.

X-ray findings are somewhat in dispute. In his series of cases, Walker reported the x-ray of no value. In his discussion of Elmer Hess's case, to be referred to later, J. R. Carty states that a tumor or mass within the loop of the duodenmum tends to expand the later. This is suggestive of a growing tumor mass within the duodenal loop. This may be detected by measuring the vertical and horizental diameters on the roentgenogram. Stillman reported suggestive x-ray findings in eight out of his twenty-two cases —evidenced by defects of pyloric filling— extragastric, a widened duodenal arch and stasis of the duodenum. Recent articles by Archie D. Carr and J. C.. Yaskin draw attention to various nervous manifestations noted in this type of case. Carr reported his own and the cases of others showing symptoms of hypoglycemia, occurring in cases of adeno and carcinoma of the pancreas, such as restlessness, anxiety, stupor, convulsions, hemi-paresis with slurring speech, stupor, confusion, diplopia, and automatic behavior. Yaskin, reporting on four instances of carcinoma of the pancreas of previously healthy persons, notes the symptoms of depression with crying spells, anxiety, insomnia, anorexia, loss of weight, and weakness without feeling of unreality, and other disturbances of perception, memory, and judgment; which symptoms antedated any definite G. I. symptoms and physical findings, from three to eight months.

The differential diagnosis with chronic pancreatitis is very difficult and is frequently not made even on the operating table, justifying, at times, what might be considered as otherwise unnecessary surgery. Elmer Hess, in reporting a case of adenocarcinoma of the pancreas mistaken for a calcified cyst in the lower pole of a right ectopic kidney, concludes that a tumor in the head of the pancreas can be freely movable without any G. I. symptoms and that the head of the pancreas may be freely movable despite its normal fixation.

Pathologically benign tumors are relatively frequent. Primary carcinoma is the most frequent tumor of the pancreas. Involve-

ment is reported as occurring in 60 or 80 per cent; of the body, moderately frequently, and rarely of the tail. Metastases occur principally to the regional lymph nodes and, in a large percentage of the cases, to the liver. Secondary carcinoma is thought to be uncommon. Saracoma is rare.

There is practically nothing to be done in the way of treatment except alleviative surgical procedure. It is the consensus of opinion that continuous external biliary drainage is not successful, the operation of choice being anastomosis of the gallbladder to either the stomach or the duodenum.

CASE H-1-316. Female, age 20, examined Oct. 17. 1931. Chief complaint: Extremely severe pain in the upper abdomen.

Present Illness: Patient has been under treatment for diabetes since 1926. She has been very careless about her diet during the previous month and has been taking 20 units of insulin three times daily. On October 16th, while enroute from San Francisco. she broke her syringe and missed at least three doses of insulin, but had limited her diet to liquids. About 9 a. m. on the morning of the 17th, she began feeling badly. She had a severe headache, her vision became dimmed, and blurring was present. She borrowed a regular hypodermic syringe and injected some insulin, but did not know how much. About 11 a. m. she developed a very severe pain in the upper abdomen, became extremely distended, and vomited. The pain was so severe that it caused her to cry out as it appeared in spasms. She has been in coma upon two occasions and has had numerous insulin shocks. Adherence to her diet is not constant.

General History. Occasional attacks of indigestion. Onset of menstruation at the age of thirteen and a half, which was regular until she developed diabetes. Since then she has menstruated only about once a year.

Patient was examined about 1 p. m. She looks acutely ill, is well developed and nourished. Cheeks are flushed, slight cyanosis of the lips and finger nails. Pupils react normally. She is definitely disorientated, and semi-stuporous. Respirations are very rapid, labored, and shallow, and she emits frequent grunts. Lungs are clear. Heart sounds are rapid, somewhat distant, and the rate is 136. Abdomen is well above the costal margin, showing distention. There is marked rigidity, almost boardlike, throughout. No visible peristalsis. Dull tympany throughout, with dullness most marked over the epigastrium. There is moderate tenderness over the region of the epigastrium. Liver dullness not obliterated.

Laboratory Examination. Temp. 99; pulse 136. Catheter specimen of urine: sugar, 4 plus, reduces Benedict's solution to a copper-red color; acetone, 4 plus. Blood-sugar, 740 mgms. White blood cells, 34-600; P. 82; L. M. 3 per cent; S. L. 12 per cent, B. 3 per cent.

Impression: Diabetic coma.

Treatment. The usual supportive measures were instituted and insulin was given. After ten hours, urine was free of both sugar and acetone. The pulse gradually diminished and became normal the following afternoon. Temperature became normal the following morning. Since the patient was leaving the city, she was placed on a maintenance diet with insulin, and discharged from the hospital on the third day after admission. Two reports concerning her condition have been received, both to the effect that she was progressing satisfactorily.

DISCUSSION

The occurrence of the severe abdominal pain in this case, with the abdominal findings, temperatures, leukocytosis, and marked rapidity of the pulse, would have suggested careful consideration of an abdominal lesion, and it is this type of case, without previous history of diabetes, that justifies a complete laboratory study in any suspicious abdominal emergency. This was rendered somewhat simple in this particular case by the previous history of diabetes. The additional history of a previously administered unmeasured dose of insulin brought to the fore the consideration of another possible serious complication, hypo-glycemia. The marked elevation of the blood-sugar curve again brings to our attention the lack of relationship between the height of the sugar curve and the consciousnes of the patient. Another symptom which I wish to mention and which is sometimes lost sight of in diabetic coma, is the bleeding of the gastric mucosa, with consequent vomiting of coffe-ground material, such as I encountered in a recent patient. Early in the case this may be confused with gastro-intestinal pathology. Just a word may be said, that there is no emergency, medical or surgical, which requires more careful, painstaking, and continuous attention than the diabetic coma.

PUBLIC HEALTH NOTES

J. ROSSLYN EARP, Dr. P. H.
Director New Mexico Bureau of Public Health

ANNUAL CONFERENCE NEW MEXICO PUBLIC HEALTH ASSOCIATION

Seven county health officers and twenty-eight public health nurses registered at the annual meeting of the New Mexico Public Health Association, which was held this year at Carlsbad. One of the drawbacks of part-time public health service is the difficulty which divided responsibility creates for a full attendance at such events. Perhaps the greatest benefit that can come from such a conference is the help that health officers can give to each other in solving the problems common to us all. We missed particularly some men who have been doing notable work in immunization during the past year. Those who were present were able to agree on a few conclusions. One of them is that practically no cases of syphilis in this state ever stay with their physician until they are cured. This situation certainly constitutes a challenge to the educational forces of public health.

A long-distance message reached us at Carlsbad to the effect that a woman who had been jailed for refusing to have her children vaccinated was to be conditionally pardoned by Governor Seligman. The condition was that the woman should leave the state and that, if she returned to New Mexico, she should serve out the remainder of her sentence. No protests were heard against this wise decision. We are not vindictive and the lady could have avoided conviction by leaving the state in the first place.

SCARLET FEVER IMMUNIZATION

We are sometimes asked about the present status of active immunization against scarlet fever. We believe in conservative judgment on new methods, whether in preventive or curative medicine, but some doctors are altogether too skeptical of the possibilties of preventing scarlet fever by toxin injections. There is no doubt that it can be done. Failures that have been reported must be attributed to inadequate dosage with the preventive toxin or to some other deficiency of technic. Here is just one example of recent successful experience from many that might be quoted: In Washington county, Maryland, scarlet fever has been an important problem, causing, in the last three years, more deaths than either diphtheria or typhoid fever. Recently, the school children were Dick tested, the degree of susceptibility was carefully recorded, and the majority of the susceptible were immunized by the five-dose treatment. Retests two weeks after the last dose showed 95 per cent of these children to be immune. Now for subsequent experience. Of 85 children who refused Dick test and toxin, five subsequently contracted scarlet fever. Among 276 Dick-negative children, no case developed. Among 179 completely immunized children, no case developed. Among 60 Dick-positive children who received no immunization, fifteen contracted the disease within three months of the test.

It is true that to give two skin tests and five immunizing doses is a lot of work. It is true that reactions do occur which are unpleasant, even if not dangerous. It is true that experiments at the National Institute of Health give promise of a greatly improved toxin, detoxified with formalin, in the near future.

It is also true that we have now a method of developing active immunity in a surprisingly short time, which, for institutional work or in the presence of epidemic scarlet fever, should most certainly not be overlooked.

1. Bulletin Maryland State Department of Health. Vol. 2, No. 3. 1931. page 35.

CASE OF ATYPICAL ANEMIA

W. WARNER WATKINS
ORVILLE H. BROWN, M. D.
Phoenix, Ariz.

(Case No. 13321, Case Records of Massachusetts General Hospital, as published in Boston Med. & Surg. Jour., August 11, 1927, page 236.)

Case History

A Canadian of fifty-four, a spreader in an artificial leather factory, entered the hospital September 16 complaining of intermittent bleeding from the gums.

The symptom began a year before admission. During the winter he began to have cough with sputum, worse at night, keeping him awake and choking him. The sputum was white and frothy, foul in odor and disagreeable in taste. The cough gradually decreased during the summer, while the sputum steadily increased. He became more and more shortwinded until in July he had to rest in

bed and could not climb even one flight of stairs without great dyspnea and fatigue. Since July his feet and legs had been swollen and occasionally stiff and painful and his eyelids puffy. Since that time he had been drinking sixteen to eighteen glasses a day and urinating a dozen times each day and night. For three months he had been troubled with gas. Since July he had had sores on his neck, at the corner of his mouth and on his right index finger said by a physician to be due to "bad blood." For the past six weeks he had had continual oozing of blood from his gums, causing constant spitting. During the past six days he had had four treatments with ultraviolet rays over his chest, front and back. He had had no loss of appetite or weight.

His family history shows nothing significant of familial disease so far as he knew. His wife had never been pregnant in fourteen years of marriage. He took some alcohol before prohibition. His general health had been good except for influenza during the epidemic and a touch of bronchitis three years before admission. He had had no other illnesses. Ten years before admission his back and left eye were burned by acid, leaving the vision impaired.

For seven years he had operated the spreading machine in a leather factory and had used mixtures which contained banana oil, gun cotton, benzene and many other chemicals unknown to him. He was the only person who was ill from bleeding, though many others had been poisoned.

Clinical examination showed a well nourished man with puffy eyelids, coughing and spitting thin bloody mucus. Mucous membranes pale. Skin seemed atrophic. Gums spongy and oozing. Many teeth missing, the remaining ones blood stained. Petechial hemorrhages on palate. Scars on right arm, right ankle and dorsum of left foot. Lesion the size of a quarter dollar on the right index finger. Questionable enlargement of the left epitrocchlear glands. Throat edematous. Chest barrel shaped. Expansion poor. Lungs hyperresonant. Diminished breath sounds. Location of apex impulse of the heart not recorded. No enlargement to percussion or other abnormalities. Blood pressure 110/55 to 128/23 to 148/50. Artery walls slightly thickened. Liver edge palpable 6 centimeters below the right costal margin in the mammary line. Dome at 6th interspace. Prostate tender. Ankles puffy; no pitting. Knee-jerks not obtained. Pupils equal, regular, rebounded on reacting to light. Left fundus obscured by corneal opacity. Right showed prominent choroidal vessels with pale white disc and exaggerated cupping.

Urine 20 to 80 ounces, alkaline at four of five examinations, specific gravity 1.023 to 1.015, no albumin or sugar, occasional red cells at one of five sediment examinations, about 5 leukocytes per field at another. Renal function 40 per cent. Blood: 3,000 to 2,000 leukocytes, 16 to 17 polynuclears, 52 to 38 per cent lymphocytes, 8 to 10 per cent mononuclears, 4 to 5 per cent eosinophils, 20 to 15 per cent basophils, hemoglobin 50 to 35 per cent., reds 1,940,000 at entrance, 2,350,000 after transfusion, 1,688,000 two days before death. Entrance smear showed stippling, polychromatophilia, rare microcytes and macrocytes, large filled oval forms, tailed forms and many achromic cells, a few normoblasts, few normal looking cells; two myeloblasts or lymphoblasts were seen. Platelets much reduced. Bleeding time over 30 minutes at entrance, afterwards 35, 12, 40 6 minutes (after transfusion), 1 hour. Reticulated cells 1½ per cent. to 6 per cent. October 12. Price-Jones measurements of red blood cells September 18, median 7.54 microns, dispersion 1.32 microns, characteristic of slight secondary anemia. Clotting time 7 to 14 minutes. No clot retraction after 48 hours. Icterus index could not be read September 16 and 18; 8 September 22. Fasting contents of stomach: 8 cubic centimeters mucous appearing white cloudy material, no sediment, free acid 4, total acid 6, guaiac negative. Test meal: 16 cubic centimeters mucous appearing blood streaked brown material with no sediment, occasional epithelial cells, frequent red cells, free acid 6, total acid 10, guaiac strongly positive. Stools: guaiac positive at 3 of 11 examinations; no macroscopic blood. Sputum white and bloody at the single examination. No tubercle bacilli. A few leukocytes, predominant organism a Gram-positive encapsulated diplococcus. Gram-negative diplococci also present in rather large numbers. A few Gram-negative bacilli. Blood culture negative. Wassermann negative.

X-ray examination with a barium enema showed nothing indicative of malignancy. The colon filled with some difficulty owing to a rather marked degree of spasticity. The cecum contained a large amount of gas and could not be completely filled. Examination with a barium meal showed the esophagus and stomach normal. The duodenum filled with difficulty, and at no time was it completely filled. At the six-hour examination the stomach was empty. The head of the meal was in the cecum. The cecum was normal. Re-examination with atropin was recommended. The diaphragms were in the normal position. There was no fluoroscopic note as to excursion. There was some thickening of the hilus glands. The lung fields and apices were essentially clear. The skull and long bones were negative. There was no evidence of mediastinal tumor or of malignancy. Another examination of the chest the following day confirmed these findings. Portable plates a week later were rather unsatisfactory, but as far as could be determined there had been no change in the chest since the last observation.

Temperature for the first week 98.6° to 101.5°; afterwards only three times below 101°, maximum 105.7°. Pulse 80 to 145. Respirations 20 to 48 with a terminal increase to 67.

September 17 examination showed a few purpuric spots about the axillae and on the soft palate, ecchymosis on the right knee, the left lung dull, with decreased voice and breath sounds. The spleen was easily palpable. Continuous with the liver and descending on respiration he found an ill-defined, irregular, doughy mass.

September 23 a biopsy was done, the removal of a small fragment of a rib under local novocain. The pathologist reported that the microscopic sections were not suitable for diagnosis. Following the biopsy there was elevation of temperature and pulse. September 24 650 cubic centimeters of blood was transfused.

September 27 and 28 in examination of six coverslip smears 112 leukocytes were found. Of these 12 per cent. were possible lymphocytes of medium and large size, slightly atypical. 58 per cent. wer neutrophilic cells; polynuclears 12 per cent., metamyelocytes 7, myelocytes 12, premyelocytes 6, myeloblasts 18, unclassified 4.—as nearly as these atypical cells could be classified. The remaining leukocytes contained basophilic large granules, i. e., were mast cells. In smears made September 29 stippling and basophilia, diffuse and punctate, were common. Nucleated red cells could be found. Naked pyknotic nuclei were found not infrequently.

September 29 400 cubic centimeters of blood was transfused and October 3 650 cubic centimeters. The patient went downhill steadily. The bleeding from the gum stopped for three or four days after each transfusion, then recommenced. October 8 700 cubic centimeters of blood was transfused. The temperature rose to 104.5°. October 12 450 cubic centimeters of blood was transfused. The tempera-

(Continued on page 266)

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THE NEW MEXICO MEDICAL SOCIETY, NOTES OF THE SEMI-CENTENNIAL SESSION

Santa Fe, N. M., May 19-21, 1932

The large registration and attendance was surprising to the officers of the Society, and extremely gratifying and flattering to the members of the Santa Fe County Society, for, despite the excellent program which had been arranged by the entertaining component Society, it was feared that business conditions would greatly curtail the number of visiting physicians. As it was, an even hundred registered for the Fiftieth Annual Session. An interesting commentary is a quotation from the July, 1924, number of SOUTHWESTERN MEDICINE, on the Forty-Second Annual Session of the Society at Santa Fe, in May, 1924, "Seventy-five were registered as being among those present—not a bad showing in a year when financial conditions have been anything but good."

As Governor Seligman stressed, in his address of welcome, what could be more fitting than to hold the semi-centennial session of the Society in the ancient and historic capital city of the State? Santa Fe responded with beautiful weather, for the most part, which, of course, greatly enhanced its natural loveliness.

The laity turned out in large numbers to hear Dr. Sansum's lecture on "Treatment of the Underweight, Indigestion, and Allergy," at the Thursday night session, and then came right back in the morning to witness the movies and listen to the symposium on Cancer, as portrayed by Dr. A. Soiland (Los Angeles), Dr. W. S. Lemon (Rochester, Minn.), and Dr. C. G. Toland (Los Angeles).

The visit to the Laboratory of Anthropology was delightful, the members and their ladies being especially pleased with the wonderful exhibits of pottery and other specimens, and the hospitalities extended by Director and Mrs. Nusbaum.

The dinner dance at the La Fonda was thoroughly enjoyed by those present, dancing being participated in until a late hour. The fancy Spanish and Indian dances by natives in costume, sponsored by the hotel management, were highly attractive and entertaining.

The election of officers resulted in:

President-Elect—Dr. H. A. Ingalls, Roswell.

Vice-President—Dr. C. F. Milligan, Clayton.

Secretary-Treasurer—Dr. L. B. Cohenour, Albuquerque (re-elected).

Councilors, three years—Dr. C. B. Elliott, Raton, and Dr. R. O. Brown, Santa Fe.

Delegate to A. M. A. for years 1933-1934—Dr. H. A. Miller, Clovis.

Alternate—Dr. J. W. Board, Clovis.

Delegate to Texas State Meeting—Dr. H. A. Ingalls, Roswell.

Delegate to Colorado State Meeting—Dr. T. P. Martin, Taos.

Delegate to Arizona State Meeting—Dr. G. T. Colvard, Deming.

Meeting place for 1933: Roswell, N. M.

Important business transacted:

(1) Appointment of Committee composed of Drs. R. H. Pousma (Rehoboth), R. O. Brown (Santa Fe), and J. R. Earp (Santa Fe), to deal with the problem of providing medical attention in the small, isolated and rural communities.

(2) Amendment to By-Laws, Section 3, Chapter 8—striking out the words, "It shall represent the Society," and substituting in place thereof the words, "It shall assist the Council."

(3) Amendment to By-Laws, Chapter 7—add Section 6, as follows: "The Council shall represent the Society in securing and enforcing legislation in the interest of public health and scientific medicine. It shall keep in touch with professional and public opinion, shall endeavor to shape legislation so as to secure the best results for the whole people, and shall strive to organize professional influence so as to promote the general good of the community in local, state, and national affairs and elections."

By these amendments the Council will be enabled

to deal with public-health problems and legislation insofar as it pertains to looking out for the interests of the medical profession and the public.

The followni resolutions were adopted:

(1) For the appropriation of $500 for the use of the Council, to be expended as it may deem necessary during the ensuing twelve months in the interest of legislation pertaining to public health and scientific medicine, and to pay the expenses of holding special meetings in the the interests of the Society with request that at leavt one special meeting be held during the 1933 session of the Legislature to consider such matters and take such action as may be necessary.

(2) That the New Mexico Medical Society notes with regret the passing from this life of the following: Dr. Jesse G. Holmes, Alamogordo; Dr. Daniel H. Lewis, Albuquerque; Dr. E. D. McKinley, Alamogordo; Dr. J. O. Hatcher, Deming.

(3) That thanks be extended to the Governor of New Mexico, the Mayor of Santa Fe, the Santa Fe County Medical Society, the Program Committee, the Entertainment Committee, the Committee on Arrangements, Director and Mrs. Nusbaum of the Laboratory of Anthropology, and, in addition, the managemnet of the La Fonda Hotel, the members of the press, the Ladies' Auxiliary, and the management of the Lensic Theater, for the very cordial hospitalities extended and courtesies shown the members and visitors, which assured success for the meeting.

Those registering were:

Alexander, Geo., Asheville, N. C.
Alexander, H. A., Santa Fe, N. M.
Ambler, C. J., Mountain Air, N. M.
Barakat, M. E., Santa Fe, N. M.
Barton, W. C., Santa Fe, N. M.
Bass, C. R., Cimarron, N. M.
Beam, M. P., Albuquerque, N. M.
Berchtold, V. E., Santa Fe, N. M.
Blakslee, M. O., Las Lunas, N. M.
Bowen, Sarah, Dixon, N. M.
Brown, Robert O., Santa Fe, N. M.
Cantrell, W. B., Gallup, N. M.
Cohenour, L. B., Albuquerque, N. M.
Cornish, P. G., Sr., Albuquerque, N. M.
Cornish, P. G., Jr., Albuquerque, N. M., and Mrs. Cornish.
Crail, F. H., Las Vegas, N. M.
Churchill, C. H., Albuquerque, N. M.
Davis, C. C., Albuquerque, N. M.
Doepp, F. F., Carlsbad, N. M.
Doughty, J. M., Tucumcari, N. M.
Draper, Paul A., Pueblo, Colo.
Dunham, J. I., Chama, N. M.
Duncan, R. A., Amarillo, Texas.
Earp, J. R., Santa Fe, N. M.
Epler, Crum, Pueblo, Colo.
Espinosa, T., Espanola, N. M.
Ellis, T., Las Lunas, N. M.
Fiske, E. W., Santa Fe, N. M.
Flude, J. M., Los Angeles, Cal.
Frisbie, Evelyn F., Albuquerque, N. M.
Funk, J. E., Santa Rosa, N. M.
Ganett, Thomas C., Philadelphia, Pa.
Garduno, J. L., Albuquerque, N. M.
Gellenthien, C. H., Valmora, N. M.
Griswald, G. W., Roswell, N. M.
Griswold, L. E., Oklahoma City, Okla.
Hannett, J. W., Albuquerque, N. M.
Harris, J. E. J., Albuquerque, N. M.
Hendrick, James M., Amarillo, Tex., and Mrs. Hendrick.
Howe, William, Las Vegas, N. M.
Irish, C. W., Pasadena, Cal.
Ingalls, General H. A., Roswell, N. M.
Johns, E. W., Albuquerque, N. M.
Johnson, Emil E., Cortez, Colo.
Jones, George W., Clovis, N. M.
Jones, Hugh T., Los Angeles, Cal.
Joyner, W. T., Roswell, N. M.
Kanes, J. P., Santa Fe, N. M.
Kaser, W. E., Las Vegas, N. M.
Kennedy, James D., Toadlena, N. M.
Lathrop, A. S., Santa Fe, N. M.
Laughlin, Z., Taos, N. M.
Lemon, W. S., Rochester, Minn.
Lingenfelter, G. C., Denver, Colo.
Livingston, W. H., Santa Fe, N. M.
Low, Harold T., Pueblo, Colo.
Lovelace, W. R., Albuquerque, N. M.
Martin, Wallace P., Clovis, N. M.
Martin, T. P., Taos, N. M .
Matthews, E. C., Albuquerque, N. M.
MacWhorter, J. H., El Paso, Texas.
McBride, Earl B., Oklahoma City, Okla., and Mrs. McBride.
McIntyre, E. H., Santa Fe, N. M.
Menninger, William C., Topeka, Kans.
Mendelson, R. W., Albuquerque, N. M.
Mera, Frank E., Santa Fe, N. M.
Dr. R. O. Brown, Santa Fe.
Miller, C. A., Las Cruces, N. M.
Miller, H. A., Clovis, N. M., and Mrs. Miller.
Milligan, Chas. F., Clayton, N. M., and Mrs. Milligan.
Miles, L. M., Albuquerque, N. M.
Mulky, Carl, Albuquerque, N. M.
Nesbit, O. I., Espanola, N. M., and Mrs. Nesbit.
Peters, L. S., Albuquerque, N. M.
Powers, George L., Amarillo, Texas.
Pousma, R. H., Rehoboth, N. M.
Prince, N. C., Amarillo, Texas.
Proctor, F. I., Santa Fe, N. M.
Rife, Dwight W., Santa Fe, N. M.
Rolls, James A., Santa Fe, N. M.
Rupert, L. E., Florence, Colo.
Sansum, W. D., Santa Barbara, Cal.
Sethman, Harvey T., Denver, Colo.
Smith, N. M., Las Vegas, N. M.
Smith, M. F., Raton, N. M., and Mrs. Smith.
Soiland, Albert, Los Angeles, Cal.
Steel, J. A., Hatch, N. M.
Stewart, A. B., Las Vegas, N. M.
Stump, P. M., Winslow, Ariz., and Mrs. Stump.
Strickler, Daisy H., Solomon, Kans.

Swan, W. H., Colorado Springs, Colo.
Thompson, L. A., Springer, N. M.
Tippins, J. R., Santa Fe, N. M.
Toland, C. G., Los Angeles, Cal., and Mrs. Toland.
Van Atta, J. P., Albuquerque, N. M.
Vickers, F. D., Deming, N. M., and Mrs. Vickers.
Vogt, A. H., Albuquerque, N. M.
Von Wedel, E., Oklahoma City, Okla.
Ward, E. L., Santa Fe, N. M.
Warder, M. R., Albuquerque, N. M.
Williams, D. B., Santa Fe, N. M.
Witwer, W. F., Las Lunas, N. M.
Woolston, W. H., Albuquerque, N. M.
Wylder, M. K., Albuquerque, N. M.

Full transactions of the meeting will be published in an early issue.

CASE OF ATYPICAL ANEMIA

(Continued from page 263)

ture dropped to normal, but rose in the evening to 102°. The respiration was 60. The patient was mentally clouded. He sank rapidly. October 13 a medical consultant wrote: "Clinically this case is atypical if the condition is due to benzol. He has an appearance suggesting peripheral blood destruction which is borne out by the icteric index, and this is rarely if ever due to benzol. In addition to peripheral blood destruction he now shows evidence count of 2,000 and the changed character of the red cells suggest toxic action of some sort on the bone of practically complete bone marrow aplasia. This last is characteristic of benzol. The undifferentiated character of many of the white cells, the leukocyte marrow. The influence of benzol cannot be ruled out. If it is present an additional unknown factor seems to me to be present."

October 14 the patient died.

Discussion by Dr. Watkins

It is not my purpose to present a diagnostic discussion of this case, as I had to read the autopsy findings in order to make intelligible selection of it for discussion. Dr. Brown is to present the diagnostic analysis. As an introduction to that, I wish to review some of the important facts relative to the white blood cells, since this case is essentially a study in white blood cell pathology.

The clinical blood picture, as we see it by laboratory methods, is made up of mature circulating cells, differentiated and mixed in fairly constant proportions. These cells do not originate in the circulating blood, but in certain solid tissues from which they are being constantly supplied to the blood. While we study the matured cells in the counting chamber and on stained slides, we must keep in mind that the blood picture thus seen by us is the terminal scene of a process of changes taking place elsewhere. Until we are able, from what we see in this final picture, to visualize in the mind's eye the whole process, we cannot properly appreciate the pathological pictures.

As a corollary of this discussion, it may be said that we are entering on an era of microscopic study of the blood. For several years, research and clinical methods have centered around the chemistry of the blood, believing that we had reached the limits of facts in the microscopic study. It is now becoming apparent that we have only touched the fringe of what the microsope can reveal to us about the blood, and throughout the world attention is turning to a more intensive study of the blood cells, their detailed structure, their response to various stimuli, and the meaning of the ever charging blood picture in infections and other diseases. Even in the study of cancer, research workers are going back of the histologic pictures of the stained sections to the individual cell and its internal structure, and even to the ultramicroscopic study of granules in the blood plasma, for new facts about cancer.

So, when we center our attention on the blood cells, we are not rehashing some old story long forgotten, but we are looking forward through a new door into a new and hitherto unexplored field of medicine. However, what I shall recall to you now, is a rehash of things which are known, intentionally ignoring theories or speculations, to the end that we may have a solid foundation for whatever future studies we may undertake with regard to white blood cells.

The tissues in which the blood cells are made are called the hematopoietic organs or tissues, and are of three classes:

(a) The myelogenous system, consisting of the bone marrow; this furnishes the granulocytes, the erythrocytes and the blood platelets.

(b) The lymphatic system, consisting of the spleen, the lymph nodes and the dispersed lymphoid tissue of the body; these furnish the small and large lymphocytes.

(c) The reticulo-endothelial system, distributed through the body, in spleen, liver, bone marrow and connective tissue; this gives rise to the large mononuclears or monocytes.

In each of these tissues there are embryonic types of cells from which arise, through a series of changes, the mature cells of the blood. Normally only the mature cells appear in the blood. The degeneration of worn out cells takes place in the blood, and these are replaced by mature cells from the hematopoietic centers above mentioned.

Normally we will have in the blood seven types of cell in fairly constant proportion, giving us the NORMAL HEMOGRAM, with proportions approximately as follows:

Polymorphonuclear Granulocytes	55
Band form nuclear Granulocytes	5
Eosinophiles	3
Basophiles	1
Small lymphocytes	25
Large lymphocytes	5
Monocytes	6

This is the simplest, elementary blood picture that we have, showing only the white cells. The proportions given here are those which we find in normal people acclimated to the dry sections of the southwest, the proportions of cells differing from those given in textbooks, which refer to sea-level moist climates. In 1910, stimulated by the researches of Dr. Gilbert of Boulder, Colo., we established the normal white blood cell picture for this section of the country.

In order to fix the signicance of this picture in our minds, let us retrace the origins of these cells of the Normal Hemogram.

In the bone marrow we have the myeloblast, from which are derived the four granular cells of the normal blood; these are the eosinophile where the granules take the acid dye, the basophile where the granules take the basic dye, and the two neutrophiles, one with the band-like nucleus and one with the polymorph nucleus.

From the reticulo-endothelial tissues, of the bone marrow and elsewhere, come the monocytes with small granules.

From the lymphoid tissue, the lymphoblasts give rise to the small and large lymphocytes.

Of all these cells, only the granular neutrophiles pass through a recognizable series of changes from myeloblast to polymorphonuclear neutrophile. This series of changes is best studied in the acute pyo-

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genic infections, to which we will come in a moment.

As the cells of the blood finish their life cycle and undergo degeneration, physiologic regeneration and replacement by new cells take place without changes in proportions, the worn out cells disintegrating and disappearing and fresh cells taking their places.

The response to an ordinary mild stimulus will usually simply increase the number of circulating cells, without material change in their proportions. The reason for this is the fact that the first response to infection results in a migration of already existing leukocytes from the lymph spaces into the blood stream, and since the leukocytes probably have the same proportions in the lymph as in the blood, we have a simple increase in numbers along the highways of the body, without changes in proportion.

Very soon, in the course of an acute infection, this surplus of pre-existing cells will be used up and the call reaches the myelogenous tissues for new cells. This tissue can respond with an increase in mature cells, both the polymorphonuclear which are the older adult cells, and the young adult or band cells. We find the blood picture now showing a relative increase in the neutrophile granular cells, and a relative decrease in the lymphocytes. The lymphocytes are probably not actually decreased in members, at this stage, but appear to be less numerous because of the increase of polynuclears.

When the battle begins to go against the organism, we find that the excess of polynuclear cells becomes extreme, and there will begin to appear in the blood the juvenile type of granulocyte. This has the same significance as would the corresponding reaction, if we regard the body as an organism maintaining a standing army and a series of reserves to resist invasion by a foreign foe. We first have the mobilization of the regular army in the mature polynuclear cells; as the need becomes more acute the first reserves in the form of the younger adults or band cells are called upon. When it becomes necessary to call upon the juvenile cells, it is just as significant as it would be if a country became so exhausted it must call on the fifteen year old boys to join the fighting forces.

Sometimes a drop in the total count, following a primary leukocytosis may have ominous significance, which may be overlooked, unless careful attention is paid to the differential count. It may mean an exhaustion of the ability of the bone marrow to supply further mature cells, or even any more cells at all. We see this in streptococcic sepsis, where the total count and the red cells drop, —through exhaustion of the hematopoietic ability of the bone marrow. One of the most dramatic instances of this is in the condition we studied some weeks ago,—agranulocytosis, better known as malignant neutropenia. Here the ability of the bone marrow to produce granular cells almost ceases, although usually the red cells are produced in normal numbers.

This brief review of what is likely to take place in acute infections gives us a basis of better understanding for what occurs in chronic blood conditions.

We must remember that two things are going on simultaneously with variations:

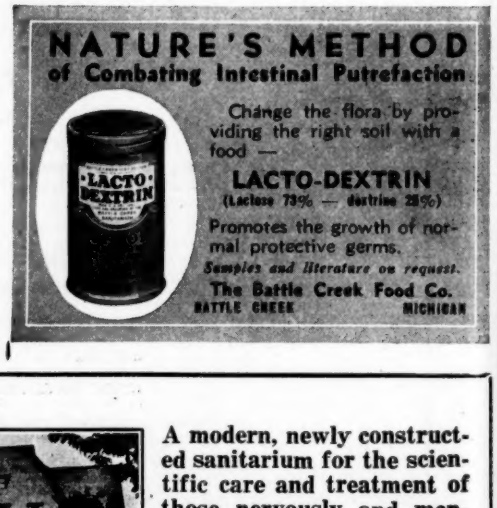
(1) The peripheral destruction of the circulating cells. There is a normal physiological degeneration, and normal replacement. There are many conditions which accelerate the destruction of the circulating cells, like the benzol poisoning which comes into question in the case we study today, or infections of various types.

(2) The replacement by new cells from the hematopoietic tissues, which normally are mature cells, but in response to more profound stimuli, the younger forms may appear. As long as the replacement ability keeps pace with the demands, we have a certain blood picture. When the stimuli are too great or of too long standing, this ability may be exhausted, and we will then have a different blood picture.

Discussion by Dr. Brown

The interest in this case centers about the low per cent of polymorphonuclear neutrophilic leukocytes, in a man in middle life with a serious mouth infection.

The granular leukocytes, it is now generally believed, arise from the bone marrow by a differentiation of the neutrophylic myelocytes. It is also generally believed that the eosinophiles of the blood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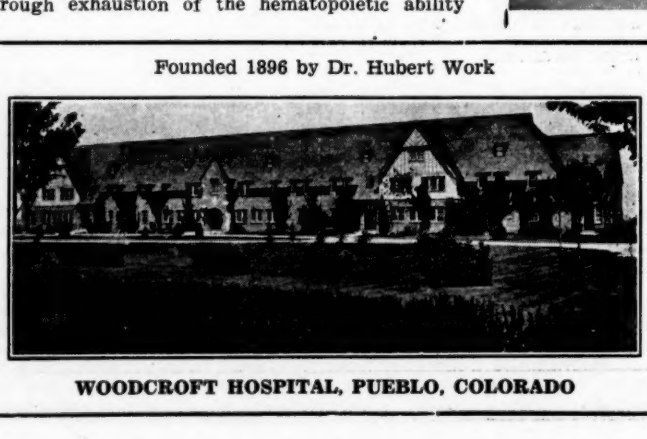

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are derived from eosinophilic myelocytes of bone marrow. This view, however, is not so generally accepted as is the conception that the granular leukocytes come from the bone marrow. Endothelial cells of the blood are now held to originate from endiothelial tissue. From these facts one must conclude that the lesion which affects the granular cells probably would have relatively little or no effect upon the endothelial cells or lymphocytes, which do not arise from the bone marrow.

Krumbhaar, in an article published in 1926, reports a series of cases in which profound granular cell disturbances were produced from a variety of severe infections and toxemias. One of his cases was of "agranulocytosis" with Vincent's organisms in the mouth. This patient made a complete recovery.

From a theoretical standpoint, it would seem that a lesion of bone marrow affecting that part which has to do with the manufacturing of the granular leukocytes and their forerunners may be either stimulating or depressing. The irritating lesion would throw into the blood stream a greater than normal amount of the bone marrow cells, producing typical myelogenous leukemia. In the event, however, that the lesion were violently destructive there migt be none or nearly none of the bone marrow cells appearing in the blood. The lymphocytes, manufactured in the lymph nodes and other lymphatic structures, and the endothelial cells would still be present in the blood stream, usually in smaller numbers. Ordinarily, in myelogenous leukemia the proportion of lymphocytes to myleocytes is low. But, in the event, of a violently destructive lesion of bone marrow, the proportion of lymphocytes to myelocytes would be high because of the absence of the myelocytes.

On that course of reasoning it seems rational to me to call this an acute myelogenous aleukemic leukemia.

The preferable name, however, according to Professors Meyer and Rosenburg is "agranulocytopenia" after David; or sepsis agranulocytica after Friar. Schultz in 1922 first described the symptom compleet under the heading "agranulocytica angina." Piney and Wyard referred to it as "agranulocytosis."

My dioagnosis then is "agranulocytopenia."

Differential Diagnosis by Dr. Richard Cabot
(Taken from above Journal

The main interest in this case is its contrast to pernicious anemia. The chief contrasts are as follows: in the first place he has no tongue symptom complex under the heading "agranulocytica because patients usually do not mention it unless you ask them. In the second place there are no finger symptoms. In pernicious anemia you usually get numb fingers. In the third place there is no achylia, which I agree with Dr. Minot is as reliable as any sign of pernicious anemia we have. Fourth, this case goes steadily down from bad to worse. Pernicious anemia does not do that. The red count goes down and up once, twice, or three times, and usually that is the last. Pernicious anemia is never progressive. This anemia is progressive and therefore not pernicious. Fifth, there are a good many points against pernicious anemia in the blood; the strikingly small number of polynuclear cells and the absence of any enlargement of the red cells, which we almost always get in pernicious anemia. As far as I know there are only three diagnoses to be considered: (1) an aplastic anemia, an anemia in which the bone marrow does nothing; (2) benzol poisoning, which so far as I know cannot be distinguished post mortem except that if you find no cause you call it

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aplastic, and if you find a cause it is poisoning. (3) The third possibility which I do not know how to exclude is bone marrow tumor. They have been over the body pretty carefully, I should say. There was something below the liver. It is described only once and never mentioned again. I do not know whether to take it seriously or not. I do not know any tumor of the liver that will give us a picture like this. If it had been hypernephroma they probably should have got some evidence of metastasis in the bones, whereas so far as I know bone marrow tumors do not show characteristic x-ray changes.

I cannot say any more. I do not know how to exclude benzol in this case. I do not know how to exclude a marrow tumor. I think it is between those two rather than the so-called aplastic anemia. A few years ago I should have said, What is the use of taking up this time in discussion? It does not make any difference anyway. Now we say, If it is pernicious anemia we can cure it. The only thing I am sure about is that it is not pernicious.

Discussion of Postmortem Findings by Dr. Mallory.
(Taken fro above Journal)

Anemia, atpyical.

Bronchopneumonia.

Hyperplasia of the bone marrow.

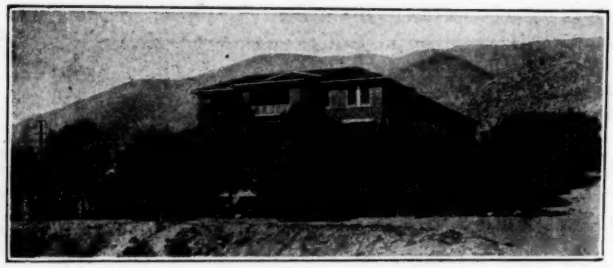
We pathologists I think have been a little bit spoiled because we are generally accustomed to have the last word on everything, but this is one case in which we could not get any farther than the clinicians. He certainly did not have an aplastic anemia. We can say that definitely, because he had a very red bone marrow and microscopically it showed a very rapid production of red cells and also of the white cells. Why these rapidly forming blood elements were not being distributed into his peripheral blood stream I have no idea. The proportions in the femoral bone marrow, which of course in a normal person is composed almost purely of fat, were approximately the proportions of white and red cell formation that we normally find in the vertebral or sternal marrow, where red and white cell formation goes on under normal circumstances. The picture was not that of a myelogenous leukemia, or even of the aleukemic leukemia, a term used where the bone marrow is completely filled with rapidly forming cells of the white cell series. In this case there were more reds being formed than whites, and there was nothing to suggest a neoplasm.

As to his other organs, he had a slightly enlarged heart and some congestion of the liver and kidneys. There was a slight, not a very definite cirrhosis of the liver.

The spleen was fairly large, about 480 grams, and much congested. On microscopic examination a good many normoblasts were seen there and a great many phagocytic endothelial cells which were ingesting red cells. That is something that we very commonly find in hemolytic anemia, but it is not in itself sufficient to make a diagnosis.

The two cases of benzol-poisoning I have seen had absolutely aplastic marrows, whereas here we have an extremely hyperplastic one. I have seen the marrows of rabbits treated with benzol where in certain stages you get a hyperplastic marrow, but nothing comparable to this. I cannot say that it is not benzol, but it is not characteristic of any of the fatal cases that we have seen here.

Dr. Cabot: I still think benzol is the best guess.



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BOOK REVIEWS

SIMPLE LESSONS IN HUMAN ANATOMY, by Morris Fishbein, M. D., Editor, Journal of the American Medical Association, Chicago, published by the Association.

This is a very excellent book and the reviewer has already loaned the one sent for review, to one or two laymen friends. It is suitable for material for popular talks on anatomical matters, as well as for illustrations. It gives authoritative information in simple language and is fully illustrated. The comparisons throughout are taken from familiar phenomena in the mechanical and physical worlds. It is commended to any doctor who wishes to place in the hands of a patient or student a simple work on anatomy.

W. W. W.

PHYSICIANS' MANUAL OF BIRTH CONTROL, by Antoinette F. Konikow, M. D., author of "Voluntary Motherhood"; Buchholz Publishing Co., 1440 Broadway, New York.

This book is what the name implies. It is founded upon actual clinical investigation. The subject is handled in a matter-of-fact manner that robs it of all but the scientific aspect.

The author's choice of method is a pessary plus antiseptic paste. When properly used, she has had but 3.2 per cent failure in 411 cases.

Physicians, even though opposed in principle to the object of the book, should know its contents.

O. H. B.

BODY MECHANICS, EDUCATION AND POSTURE—the report of the subcommittee on Orthopedics and Body Mechanics of the White House Conference on Child Health and Protection.

This is the report after searching investigation on the relation of body mechanics and posture to the health and well being of children. A mass of clinical evidence is presented to prove that not less than two-thirds of the young children of the United States exhibit faulty body mechanics. "The Chelsea Report," included in the book, proved that improvement in body mechanics resulted in improvement in health and efficiency.

This is a subject of vital importance to the physician and to the child, but there are few subjects of which the physician is so ignorant. To all who would learn, this splendid book is recommended.

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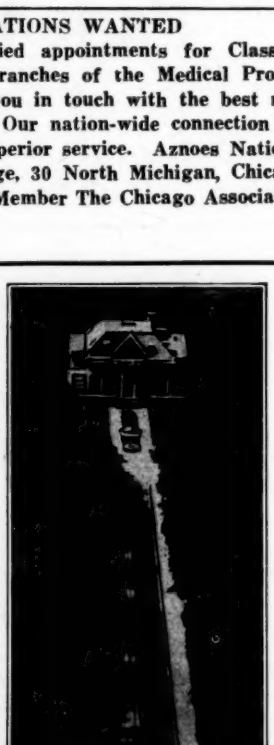

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